MONTHLY WEATHER REVIEW.

VOL. XI. WASHINGTON, D. C., APRIL, 1883. No. 4.

INTRODUCTION.

A summary of the general meteorological conditions which prevailed over the United States during April, 1883, is presented in this REVIEW. Brief descriptions are also given of the storms occurring in the north Atlantic ocean, the centres of which are approximately shown on chart ii.

April has been marked by severe local storms and tornadoes in many of the states, which have caused great loss of life and property.

The storm traced as number viii., on chart i., was of unusual severity. It appeared on the Pacific coast on the 19th, and crossed the continent during the succeeding five days. With this barometric depression occurred the violent tornadoes of the 22d and 23d in the southern states; and during its passage over the Rocky mountains, the lowest barometric readings observed during the past twelve years were recorded.

Respecting the temperature of April, there have been no marked deviations from the normal.

The precipitation has been above the average over a large area, extending from the north Pacific coast southeastward over the interior to the south Atlantic and Gulf coasts. It has been deficient in California and along the northern and southern boundaries of the country.

Dangerous freshets, occurring mostly in the smaller rivers and streams, in New England, the southern states, and Canadian Provinces, were attended by loss of life and destruction of property.

During 1882, from April to October, inclusive, special temperature and rainfall observations were made throughout the cotton-growing regions of the south. On April 1, 1883, these observations were resumed in those districts, and a table of averages for the same is published in this REVIEW.

Very complete reports have been received from those states in which meteorological bureaus have been organized. These will be found under the head of "Notes and Extracts," and clearly show the value of such local organizations, especially to those interested in agriculture.

The Hon. A. J. McWhirter, Commissioner of Agriculture, of Tennessee, refers to these reports as follows:

> The great advantage to the agricultural interests of accurate meteorological data is becoming more patent as civilization progresses toward a higher sphere of enlightenment and intelligence in the art of cultivating the soil so as to reap the best results. Indeed, this is so closely interwoven with the interests of the intelligent farmer, that in many of the states it has become an indispensable adjunct to the agricultural bureaus—not so much for immediate purpose, as for future reference.
>
> This department, yet in its infancy as a co-ordinate branch of the bureau, will no doubt, when brought to a higher state of excellence, prove, as it has in so many states, a most interesting and valuable auxiliary.

In the preparation of this REVIEW the following data received up to May 20th, have been used; viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and thirty-one Signal Service stations and fifteen Canadian stations, as telegraphed to this office; one hundred and seventy-six monthly journals, and one hundred and seventy monthly means from the former, and fifteen monthly means from the latter; two hundred and thirty-two monthly registers from voluntary observers; fifty-three monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports, through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather-reports from the local weather services of Indiana, Iowa, Nebraska, New Jersey and Tennessee, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure for the month of April, 1883, determined from the tri-daily telegraphic observations of the Signal Service, is shown by the isobarometric lines in red on chart iii.

The area of least mean pressure is inclosed by the isobar of 29.85, and covers southern Colorado, northern New Mexico, and northeastern Utah. From the region of least mean pressure the barometric means increase rapidly to the westward, and are greatest over the middle Pacific coast region, where a small area is inclosed by the isobar of 30.05. To the northward and eastward of the area of least pressure, the monthly means increase gradually. From the lower lake region and southern New England southward to the east Gulf states, the mean pressure is from 30.00 to 30.04, being greatest in the south Atlantic states, while over northern New England and the Canadian Maritime Provinces a slight decrease occurs, the lowest barometric means being 29.92 and 29.93, reported from Father Point, Province of Quebec, and Charlottetown, Prince Edward Island, respectively.

The monthly mean pressure, compared with that of March, shows an increase over the central Pacific coast, varying from 0.01 to 0.06. In the lower lake region, the Saint Lawrence valley, and from North Carolina northeastward, the pressure is also greater than for March, the increase being greatest in the Maritime Provinces, where it averages about 0.15. In all other districts the pressure has decreased. Over an area between the ninety-fifth and one hundred and fifteenth meridians north of the thirty-fifth parallel, the decreases are from 0.20 to 0.30; in the upper Mississippi valley and western Gulf states, they are from 0.10 to 0.20, and in other districts, where decreases have occurred, they have been less marked.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

On the middle Pacific coast, in New England, the middle Atlantic states and in the eastern part of the lower lake region, the pressure is below the normal. The departures in these districts are very slight, being most marked in New England. Elsewhere over the country the pressure is from normal to 0.11 below, the greatest departures occurring in the extreme northwest and in the lower Missouri valley.

BAROMETRIC RANGES.

The barometric ranges have been greatest over the districts lying between the Mississippi river and the Rocky mountains, where they have generally been from 1.00 to 1.57, being greatest in the western portions of Kansas and Nebraska and in eastern Colorado. The smallest ranges occurred in Florida and in southern California. The barometric ranges, as compared with those of April, 1882, are about 0.10 smaller along the Atlantic coast and from 0.30 to 0.40 smaller in the lake region, while they are from 0.50 to 0.60 greater in the northern and middle slopes. They are from 0.20 to 0.40 greater in California, and from 0.20 to 0.30 smaller in the north Pacific coast region.

In the several districts the monthly ranges have varied as as follows:

New England.—From 0.81 at New Haven, Connecticut, to 1.04 at Eastport, Maine.

Middle Atlantic states.—From 0.74 at Williamsport, Pennsylvania, to 0.90 at Cape Henry and Norfolk, Virginia.

South Atlantic states.—From 0.61 at Jacksonville, Florida, to 0.93 at Fort Macon, North Carolina.

Florida peninsula.—From 0.34 at Key West, to 0.49 at Cedar Keys.

Eastern Gulf.—From 0.69 at Pensacola, Florida, to 0.97 and 1.00 at Starkville and Vicksburg, Mississippi, respectively.

Western Gulf.—From 0.95 at Galveston, Texas, to 1.23 at Shreveport, Louisiana.

Rio Grande valley.—From 0.98 at Brownsville, Texas, to 1.04 at Eagle Pass, Texas.

Ohio valley and Tennessee.—From 0.65 at Pittsburg, Pennsylvania, to 0.96 at Nashville, Tennessee.

Lower lakes.—From 0.67 at Cleveland, Ohio, to 0.75 at Rochester, New York.

Upper lakes.—From 0.76 at Port Huron, Michigan, to 1.11 at Duluth, Minnesota.

Extreme northwest.—From 0.98 at Fort Stevenson, Dakota, to 1.02 at Saint Vincent, Minnesota.

Upper Mississippi valley.—From 0.88 at Davenport, Iowa, to 1.07 at La Crosse, Wisconsin.

Missouri valley.—From 1.16 at Leavenworth, Kansas, to 1.32 at Fort Bennett, Dakota.

Northern slope.—From 0.90 at Helena, Montana, to 1.57 at North Platte, Nebraska.

Middle slope.—From 1.10 on the summit of Pike's Peak, Colorado, and 1.18 at Fort Elliott, Texas, to 1.56 at West Las Animas, Colorado.

Southern slope.—From 0.82 at Fort Davis, Texas, to 1.08 at Fort Concho, Texas.

Southern plateau.—From 0.67 at Tucson, Arizona, to 0.94 at Santa Fé, New Mexico, and 0.98 at El Paso, Texas.

Middle plateau.—From 0.94 at Pioche, Nevada, to 1.03 at Salt Lake City, Utah.

Northern plateau.—From 0.78 at Lewiston, Idaho, to 0.82 at Eagle Rock, Idaho.

North Pacific coast.—From 0.76 at Portland, Oregon, to 0.86 at Roseburg, Oregon.

Middle Pacific coast.—From 0.70 at San Francisco, California, to 0.90 at Cape Mendocino, California.

South Pacific coast.—From 0.54 at San Diego, California, to 0.79 at Visalia, California, and 0.82 at Yuma, Arizona.

AREAS OF HIGH BAROMETER.

Eight areas of high-pressure have been traced over the region occupied by the Signal-Service stations during the month of April. Five of these were first observed in British America, near Hudson's Bay, and were afterwards traced over the northeastern sections of the United States. Three of these areas approached the stations from the Pacific, one of which passed to the east of the Rocky mountains north of Oregon; one was attended by the development of a secondary high area in the Rio Grande valley, and two disappeared without passing to the east of the coast line.

I.—The barometer was high north of the lake region on the 1st, and on the 2d and 3d the pressure increased generally throughout the western districts when this area was apparently moving to the southeast, towards the Saint Lawrence valley. On the morning of the 3d the region of greatest pressure included the Ohio and central Mississippi valleys, and during the day this area moved eastward to the middle Atlantic coast, where it disappeared on the 5th to the southeast of Cape Hatteras, North Carolina.

The temperature was from 10° to 15° below the mean in the region of greatest pressure, attended by light rain in the southern states, and light snow in Virginia and the interior of North Carolina on the 2d, followed by cool and generally clear weather at the eastern stations on the 2d and 3d.

II.—This area appeared in British America, north of Montana, on the 5th, and passed to the lake region, and thence to Indian Territory, following in its course that of i. From the southwest it passed eastward over the Ohio valley and Middle Atlantic states, disappearing to the east of the Virginia coast on the 9th. As in the preceding area the cold air flowing southward over districts east of the Mississippi, caused general rains in the Gulf states after the winds shifted to the north and east when the region of greatest pressure was off the middle Atlantic coast.

High area iii. appeared on the Pacific coast on the 5th, and at no time was it central east of the coast line. It moved slowly to the southward, as indicated by wind directions and changes in pressure, finally disappearing as a distinct area on the 7th, although the pressure continued above the mean for the month in California. The pressure was above the mean on the 7th from California eastward to the Mississippi valley, and high area ii., which was then central in Indian Territory, became more clearly defined. With the gradual decline of pressure on the Pacific coast, rains occurred from central California northward, being heavy at the northern stations.

Area iv. was central north of the lake region on the 10th, and it passed rapidly to the eastward in advance of the well-defined low area number iv. The pressure increased four-tenths of an inch in eight hours at the extreme northern stations during the night of the 10th, and on the morning of the 11th it was five-tenths of an inch above the mean for the month at these stations, while it was six-tenths below the mean near Lake Huron. Later reports indicate that this area moved directly east from Nova Scotia.

High area v. followed iv., appearing in the region of Hudson's Bay on the 12th and passing southeast to the lower Saint Lawrence valley, immediately after low area iv. had disappeared. After reaching the Atlantic coast the course changed to the south, and it slowly extended over the New England and the middle Atlantic states during the 15th, and then disappeared to the southeast over the Atlantic.

VI.—This area appeared on the Pacific coast on the 13th, and slowly extended over the Rocky mountain regions. On the 14th the pressure was three-tenths of an inch above the normal in northern California, and the line of normal pressure extended north from El Paso, Texas, to Fort Benton, Montana. On the following day the line of normal pressure followed the general course of the Missouri valley, and the pressure was from two to four-tenths of an inch above the mean in all districts between the lower Mississippi river and the Pacific coast. The centre of this area was in southern Texas on the morning of the 15th, and a light "norther" occurred on the west Gulf coast on this and the preceding day, the wind reaching a velocity of forty-two miles per hour at Indianola, Texas. This area passed to the east from the lower Rio Grande valley and disappeared south of the Gulf states on the 17th.

VII.—This was the most extended area of high-pressure observed during the month. It appeared on the north Pacific coast on the 17th, and moving eastward over the upper Missouri valley on the 18th and 19th continued within the region of observations until the 26th. It advanced as far east as Lake Ontario on the 22d, and then moved westward to the Saskatche-

wan valley, where it was central on the 24th, the barometer being six-tenths of an inch above the mean for the month. After the severe storms of the 22d and 23d in the southern states the barometer rose rapidly, and this area passed southward; first to Indian Territory on the 25th, and thence eastward over the southern states, attended by cool, clear weather in all districts on the 25th. A light "norther" occurred on the Texas coast, while this area was central west of the Mississippi river. It disappeared to the southeast of the coast line on the 26th.

VIII.—This was a slight excess of pressure which appeared in the region north of Minnesota on the 28th, accompanied by cool fair weather in the northern districts on the 29th and 30th, and light frosts at interior stations. On the 30th the pressure was greatest near Lake Huron, and at the close of the month it was greatest on the New England coast.

AREAS OF LOW-PRESSURE.

Nine areas of low-pressure have been traced within or near the limits of the Signal Service stations during the month of April. Chart i. exhibits the paths of the centres of these areas as determined from the tri-daily weather reports of this service.

The following table gives the latitudes and longitudes in which each depression was first and last observed, and the average hourly velocity of each depression:

Areas of low barometer.	First Observed.		Last Observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	°	°	°	°	
No. I.	45	126	51	62	43.5
II.	28	99	37	75	32.0
III.	50	110	49	90	23.5
IV.	39	103	48	77	22.5
V.	37	102	51	84	17.0
VI.	37	77	33	75	14.0
VII.	38	104	49	60	24.0
VIII.	44	122	40	67	27.5
IX.	45	71	47	59	37.0
Mean hourly velocity					26.8

Two of these depressions approached from the north Pacific and were distinctly traced across the continent, each having a southeasterly course until the centre of disturbance reached the lower Missouri valley. The region of greatest storm frequency extends over the states of Kansas and Colorado, although depressions are usually more frequent during the month of April in Minnesota and off the middle Atlantic coast.

I.—This storm approached the north Pacific coast on the 1st, and it was central west of Portland, Oregon, on the morning of the 2d, the rain area at that report extending from Washington Territory southward over central California. After reaching the coast line, the course changed to the southeast, and on the morning of the 3d it had reached western Utah, accompanied by rain at all Pacific coast stations, and light snow in Idaho and Montana. During the 4th, the central area extended eastward, forming a secondary depression in the lower Missouri valley, while the principal depression extended over Colorado and New Mexico and the central and southern plateau regions. At the midnight report of the 4th, two well-defined areas were traced, one central in Kansas and the other in Utah. The more easterly depression moved to the lake region during the 5th, and finally disappeared to the east of Nova Scotia on the 6th. That part of this depression which remained central in the mountain region, gradually filled up on the 5th. This disturbance passed over the eastern part of the United States with only slight energy, but the rain area extended over all districts, and the winds reached velocities on the Atlantic coast north of Cape Hatteras, ranging from thirty to forty miles an hour.

II.—This disturbance followed depression i., and resulted probably from the flow of cool air from the northern latitudes towards the Rio Grande valley after the first disturbance had passed to the east of the Mississippi valley. It was central in southern Texas on the afternoon of the 5th, and during the succeeding twenty-four hours, it passed northeastward to the lower Ohio valley, causing very heavy rains in the southwestern states, light rains in the Ohio valley, and snow or sleet in the upper Mississippi valley. During the night of the 6th, light snow or rain fell at northern stations in New England, the middle Atlantic states, and in the lake region, while the centre of disturbance passed from the lower Ohio valley to its most northern latitude, in central Pennsylvania, where the course changed to the southeast. On the 7th it passed southeastward over the middle Atlantic coast, and on the 9th it disappeared to the east of Cape Hatteras, followed by strong northeasterly gales on the North Carolina coast.

III.—This depression originated probably in the north Pacific, but the reports are not sufficient to warrant the extension of its track west of the Rocky mountains. It was central in British America, north of Montana, on the afternoon of the 7th, and moved almost directly eastward to the region of Lake Superior during the 8th, where it disappeared to the northeast. The reports from Manitoba on the 8th indicate that this area was attended by violent winds in that region. The afternoon reports of that date showed a pressure of 29.28 at Minnedosa, which at that report was south of the centre of disturbance. Succeeding reports indicate that this depression continued its easterly course north of the stations of observation.

IV.—This depression developed in the central Rocky mountain region on the 8th, and was central near Denver, Colorado, at midnight of that date. During the 9th it passed over Colorado and Kansas, developing great energy near Omaha, Nebraska, on the morning of the 10th, where the barometer had fallen to 29.44. This storm passed over the upper lake region on the 10th, attended by dangerous winds, and on the 11th finally disappeared to the northeast of Lake Huron. Cautionary signals were ordered in advance of this storm at the lake stations, and were justified by the following maximum wind velocities: Buffalo, New York, 44, sw.; Milwaukee, Wisconsin, 44, w.; Grand Haven, Michigan, 36, sw.; Toledo, Ohio, 32, sw. The wind at first was strong from the eastern quarters, but the greatest velocities occurred after it had shifted to the west or southwest. When last observed on the 11th this storm continued clearly defined as a low area moving northeast of the Canadian stations.

V.—During the night of the 11th an extended depression in the southern Rocky mountain region indicated the development of a barometric disturbance in that section. The barometer continued to fall in Colorado during the 12th, and by 11 p. m. of that day it had reached 29.31 at West Las Animas, Colorado, where this depression was clearly defined, inclosed by the isobars of 29.40 and 29.50, the general form of the depression being elliptical, with the longer axis pointing to the east along the thirty-eighth parallel of latitude. The course of the storm changed to the northeast on the 13th, and the elliptical form of the central depression continued, with a change of direction of the longer axis from east to northeast. After reaching the region of Lake Superior the winds became violent in the upper lake region, and on the morning of the 15th the barometer had fallen to 29.24 at Duluth, Minnesota, which was near the centre of disturbance. This storm passed almost directly north from Lake Superior, but it was followed by strong westerly winds at the northern stations and severe local storms in the upper Mississippi valley. The maximum velocity of the wind occurred at Milwaukee, Wisconsin—47 miles, sw.

VI.—This was a depression of slight energy which developed in the northern portion of the south Atlantic states on the 15th, and after passing to the east of the Virginia coast line it apparently moved to the southward, near the coast, and disappeared to the east of Wilmington, North Carolina, on the 17th. Violent gales occurred near Cape Henry, Virginia, and along the North Carolina coast, as this disturbance pushed to the southward. The wind, which came from the northwest, reached a velocity of fifty miles at Cape Henry.

VII.—This disturbance also developed in the central Rocky mountain region, where it was central on the night of the 16th.

It passed directly eastward over Kansas and Missouri during the 17th and 18th as an extended depression of slight energy, although attended by severe local storms and general rains in districts east of the Mississippi river. The barometer was from one to three-tenths of an inch below the mean for the month in these districts, with local depressions in the Ohio valley and middle Atlantic states on the 19th. It passed to the east of the New England coast, where the course changed to the northward, carrying it over the Maritime Provinces with increased energy, and violent gales at the most northerly stations.

VIII.—This storm approached the stations from the north Pacific coast on the 18th, and was clearly traced from that coast across the Rocky mountains to Colorado, where it was central on the 21st. It was the most marked barometric depression of the month, the barometer reaching its minimum when the disturbance was central in Colorado on the morning of the 21st, when it read 28.88, at West Las Animas. After remaining about stationary during the 21st, it continued its southeasterly course during the 22d, causing a secondary depression to form in southeastern Kansas, while the principal disturbance was central near Cairo, Illinois. Violent local storms and tornadoes occurred in the south and east quadrants of this depression during the 22d and 23d, causing great loss of life and property. These storms are described under the heading, "Local Storms" in this REVIEW. The most destructive of these was the tornado which occurred in Mississippi on the 22d, and the "Indications" issued by the signal office at 1 a. m. of the 21st, were as follows: "Warmer southeast to southwest winds, threatening weather and rain, lower barometer and violent local storms on Saturday (21st) night and Sunday (22d) morning."

After the barometric disturbance passed to the east of the Mississippi valley it became less clearly defined, but it passed eastward off the North Carolina coast, causing dangerous gales near the coast from Jacksonville, Florida, to Boston, Massachusetts. High winds also occurred at the Gulf stations and on the lakes. The observer at Toledo, Ohio, reports that the cautionary signal at that station saved $5,000 to the fishermen of that section, and retained in port shipping valued at $300,000.

IX.—This was a slight disturbance which developed in northern New England on the 24th, when the preceding disturbance was apparently central to the southeast of the New England coast. It moved directly eastward, with increasing energy, and was central near Sydney, Nova Scotia, on the morning of the 25th.

NORTH ATLANTIC STORMS DURING APRIL, 1883.

[Pressure expressed in inches and in millimeters; wind-force by scale of 0—10.]

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during April, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in the north Atlantic and from other miscellaneous data received at this office up to May 21st. The observations used are in general simultaneous, being taken each day at 7 h. 0. m. a. m., Washington, or 0 h., 8 m. p. m., Greenwich mean time.

Of the six depressions charted, two, viz.: iv. and vi., are traced as continuous storms from the United States over the ocean; but only the latter appears to have reached the European coasts. Number i. was probably a continuation of low area vii. of the March chart, while ii., iii. and v., apparently originated near the Banks of Newfoundland. Of these, v. has been traced eastward to the British Isles.

The month was in general stormy, and for the better description of the weather conditions which prevailed, may be divided into four periods. The first (1st–10th) was characterized by a continuance of moderate to strong southerly to westerly gales with cloudy or rainy weather. During the second period (11th–16th), light to moderate southwesterly to north-northeasterly breezes and fair weather generally prevailed. In the third period (16th–19th), strong westerly and northwesterly gales with cloudy weather and rain prevailed over the Atlantic east of the thirtieth meridian, while to the westward of that meridian moderate easterly winds and fair weather obtained. During the last period (20th to close of month), the winds were variable in direction; in force they were moderate to strong, increasing frequently to moderate gales.

The following descriptions relate to the storms charted:

I.—This was probably a continuation of low area vii. of the March chart. At the close of March, an extensive area of low pressures stretched from Newfoundland to the British Isles, the region of least pressure being apparently situated near the fortieth meridian. On April 1st, the depression, having moved northeastward, was central near N. 52°, W. 34°; the s. s. "Bolivia," in N. 49° 03′, W. 33° 33′, reporting barometer 29.22 (742.2), wind wnw., force 6, cloudy and squally; while strong southerly and southwesterly gales of force 6 to 8 were encountered by vessels to the eastward of the "Bolivia." During the day the depression moved rapidly northeastward with apparently increasing pressure, and on the 2d it was central near N. 57°, W. 15°, causing strong southerly winds on the western coasts of Scotland and Ireland. During the 2d the disturbance probably passed to the northward of the British Isles.

II.—On the morning of the 2d the reports of vessels between N. 40° and 50° and W. 50° and 40° indicated the presence of a somewhat deep depression over the region mentioned. The s. s. "Celtic," in N. 45° 32′, W. 42° 35′, reported barometer 29.08 (738.6), wind se., force 8, overcast and rainy, and the s. s. "Pavonia," about 1° 30′ south of the "Celtic," reported barometer 29.11 (739.4), wind s., force 8, hazy. Near W. 50°, the winds were northerly and northwesterly, force 4 to 6, and the barometric pressure ranged from 30.0 (762.0) to 30.2 (767.1). On the 3d the region of least pressures was transferred to about N. 52°, W. 29°, where the pressure ranged from 29.4 (746.7) to 29.8 (756.9). Moderate southerly gales prevailed from W. 18° eastward to W. 13°, while, in the region west of the eighteenth meridian the wind hauled to west-southwest and west, and blew with the force of a moderate gale. During the day there was a great increase of pressure east of the thirtieth meridian and the depression appears to have filled up, but another important disturbance was developing south of the Banks of Newfoundland.

III.—This was probably the most severe storm of the month, having caused great damage to vessels that encountered it. It appears to have developed near the Banks of Newfoundland during the 3d and 4th. Captain Gleadell, of the s. s. "Celtic," reported: in N. 43° 18′, W. 48° 58′, barometer began to fall rapidly from 8.44 a. m. of the 3d, at which time it read 30.15 (765.8), wind s., moderate breeze. At 8 p. m., wind se., increasing in force, much lightning in the west, barometer falling at the rate of .5 of an inch an hour. At 1 a. m., on the 4th, the wind fell light and veered to ne., with high sse. swell and rapidly rising swell from nnw., which caused a very high confused sea. At 3 a. m., the barometer read 28.53 (724.6), which was its lowest reading during the gale; at 4 a. m. it was blowing a hurricane, with dangerous sea, which continued until 10.30 a. m., when it began to moderate gradually, and at 8 p. m., it was blowing a strong breeze, with moderate sea, barometer 29.86 (758.4). From 3.20 a. m. to 8 p. m. the barometer rose as rapidly as it had previously fallen. The steamships "Dominion" and "Braunschweig," (near N. 42° and between W. 49° and 55°), on the 3d and 4th, both reported barometer below 29.0 (736.6), with winds veering from sse., through s., to wsw. and nw., and blowing with hurricane force. The s. s. "Notting Hill," which encountered this storm near N. 41°, W. 55°, had boats, bulwarks and deck-fittings carried away, and put into Halifax, Nova Scotia, in distress, on the 10th. Under the influence of this depression, vessels as far east as the forty-fifth meridian had strong southerly gales of force 10, while northwesterly gales, of force 8, prevailed as far westward as the sixty-fourth meridian. By the 5th, the storm centre had moved to about N. 44°, W. 45°; the pressure remained about the same

as on the preceding day and the winds showed no dimunition in force; vessels near the thirtieth meridian were now brought under the influence of the disturbance and reported southerly to southwesterly gales, of force 8. By the morning of the 6th, a considerable increase of pressure occurred over the ocean and the depression apparently filled up in mid-ocean during the day. On the 6th and 7th, an area of high-pressure covered the British Isles, and extended westward to the thirty-fifth meridian.

IV.—This was probably a continuation of the depression charted as low areas i. and ii., chart i., of this REVIEW. On the 7th, there was a decrease of pressure over the Banks of Newfoundland, and on the 8th, the decrease extended northeastward to W. 40°, the lowest barometric readings being south of Newfoundland. On these dates, the winds remained moderate in force and variable in direction, but on the 9th, the barometric gradient became steeper and the winds increased in force in the western quadrants. On the 10th, the pressure increased in front of the disturbance and was accompanied by a slight increase in the force of the southerly winds which prevailed, but on the 11th, the depression disappeared; clearing weather set in and the winds moderated.

V.—On the 15th, a slight decrease of pressure occurred over the Banks of Newfoundland. During the day, the depression moved northeastward, apparently skirting the edge of an area of high-pressures which occupied the ocean between N. 40° and 50° and W. 50° and 30°. On the 16th, the centre of disturbance was north of the fiftieth parallel and near W. 40°. It moved rapidly northeastward during the day, attended by a great increase of energy, and, on the 17th, was central near N. 55°, W. 17°. Captain Schoonhoven, of the s. s. "Daniel Steinmann," (near N. 50° and between W. 19° and 25°,) reported: from 6 p. m. of the 16th to 1.30 a. m. of the 17th, increasing sw. by s. gale with heavy rain; the wind suddenly shifted to w. and blew with great fury, accompanied by hurricane-like squalls, heavy rain, hail, and occasional snow. At 6 p. m. on the 17th, the barometer (aneroid) read 29.22 (742.2), which was its minimum reading during the storm; it then began to rise, but the wind continued to blow with unabating force from the wnw. until 2 p. m. of the 18th, when it gradually moderated to a strong breeze. On the 17th, strong westerly and northwesterly gales were reported by vessels south of N. 50° and east of W. 30°. On the 18th, the disturbance was central off the northwest coast of Ireland, causing strong southwesterly gales on the Irish and French coasts, and southeasterly gales in northern Scotland and the Scandinavian peninsula.

VI.—This was probably a continuance of the disturbance charted as low area vii. of chart i. During the 19th and 20th, the pressure remained low over the ocean, from the coasts of the United States eastward to Europe; within this area were apparently several subsidiary disturbances, the paths of which are too indefinite to admit of a tracing. On the 22d, a disturbance appeared on the eastern edge of the banks; during that day and the following, it moved eastward without developing any storm-energy and with slightly higher pressure near the centre. On the 24th, however, the area of disturbance apparently increased in dimensions; the pressure again decreased, but the winds still remained moderate in force, with cloudy and unsettled weather. On the 25th, the storm-centre appears to have moved southeastward, the region of least pressure being then near N. 47°, W. 20°. The s. s. "W. A. Scholten," in N. 49° 17′, W. 19° 27′, reported barometer 29.48 (748.8), wind ene., force 6, rainy; and moderate nne. to nw. gales occurred in the northwest quadrant. On the 26th, the disturbance was probably central over the Bay of Biscay, and, on the 27th, it was moving northeastward toward the English channel, causing strong southerly and easterly gales on the French coast and at the Channel stations.

OCEAN ICE.

Chart ii. also exhibits the southern and eastern limits of icebergs in the north Atlantic during the month of April, 1883. This chart is based on reports communicated by shipmasters to this office; reports furnished through the co-operation of the "New York Herald Weather Service," and other data published by the "New York Maritime Register."

Reports of vessels encountering icebergs in the north Atlantic during April, 1883, are much less numerous than during the previous months. This decrease in the number of reports does not positively indicate that the number of icebergs is diminished, as it may be due to the fact that vessels have taken a more southerly course in order to avoid these dangers to navigation. The icebergs appear to have been most numerous between N. 41° 30′ and 43° 30′, and between W. 51° and 49°.

Compared with the chart for last month (March), it will be observed that the southern limit is about half a degree farther south, while the eastern limit is about one and one-half degrees west of that of the preceding month.

On comparison with the iceberg chart for April, 1882, the following interesting facts appear: 1st. The region within which icebergs and field-ice were observed was more extensive in April, 1882; in that month the eastern limit reached W. 41°, while in April, 1883, it extended only to W. 43°. As regards the southern limit, there was no material difference, as in both years it was between N. 40° and 41°. 2d. In April, 1882, solid field-ice extended as far south as N. 44°, while in April, 1883, no field-ice was observed in the region covered by the reports.

Icebergs were reported as follows:

1st.—S. S. "Lamington," in N. 43° 30′, and between W. 48° 27′ and W. 52° 14′, passed five large icebergs and several smaller ones.

2d.—S. S. "Freja," arrived at New York from Havre, reported, saw but little ice on the Banks.

6th.—S. S. "Main," in N. 42° 38′, W. 49° 41′, passed an iceberg; also in N. 42° 46′, W. 49° 23′, passed two small icebergs.

7th.—S. S. "Cornwall," in N. 42°, W. 50′, passed a small iceberg; also, in N. 42°, W. 50° 30′, passed a large one. The s. s. "Nettlesworth" returned to North Sydney, having had bows stove by ice when off Cape Race Rocks; s. s. "Wyoming," in N. 42° 33′, W. 49° 10°, passed a large iceberg.

8th.—S. S. "Alexandria," in N. 41° 50′, W. 50° 20′, passed two large icebergs.

10.—S. S. "Lydian Monarch," in N. 41° 54′, W. 51° 05′, passed an iceberg; s. s. "Iberian," in N. 42° 45′, W. 50° 14′, sighted several large icebergs, some apparently four hundred feet high; s. s. "Bohemia," in N. 42° 57′, W.47° 28′, passed an iceberg fully two hundred feet high; s. s. "Sardinian," in N. 43° 09′, W. 50° 39′, passed an iceberg.

11th.—S. S. "Elbe," in N. 41° 45′, W. 49° 40′, passed a large iceberg and several small pieces of ice; in N. 41° 48′, W. 50° 25′, passed an iceberg about eighty feet above sea-level. S. S. "Germanic," in N. 41° 45, W. 49° 20′, passed an iceberg; also, in N. 42° 37′, W. 47° 16′, passed an iceberg. S. S. "Spain," in N. 41° 30′, W. 49° 55′, passed a small iceberg; in N. 41° 41′, W. 49° 04′, passed several small pieces of ice. S. S. "Sardinian," in N. 43° 27′, W. 48° 50′, passed several icebergs; in N. 43° 41′, W. 48° 03′, passed a small iceberg, and in N. 44° 00′, W. 47° 02′, passed a large iceberg.

13th.—S. S. "Arizona," in N. 41° 35′, W. 50′ 25′, passed a small iceberg.

15th.—S. S. "Belgenland," in N. 40° 59′, W. 48° 36′, passed an iceberg; s. s. "Rhaetia," in N. 41° 27′, W. 50° 37′, passed an iceberg one hundred feet high.

18th.—S. S. "Fulda," in N. 42° 54′, W. 50° 15′, passed two icebergs; s. s. "Jason," in N. 41° 49′, W. 55° 26′, passed two pieces of floating ice. Ship "Queenstown," in N. 41°, W. 47°, passed an iceberg apparently three hundred feet high.

19th.—S. S. "City of Berlin," in N. 41° 23′, W. 50° 53′, passed an iceberg.

23d.—S. S. "Switzerland," in N. 40° 49′, W. 52° 06′, passed a large iceberg; s. s. "Wieland," in N. 41° 19′, W. 49° 00′, passed an iceberg about one hundred and fifty feet high, drifting southward; s. s. "D. Steinmann," in N. 43° 35′, W. 48° 38′, passed a large iceberg.

25th.—S. S. "City of Paris," in N. 41° 35′, W. 48° 32′, saw

a very large iceberg; s. s. "Jersey City," in N. 43° 00′, W. 50° 20′, passed three icebergs.

26th.—S. S. "Katie," in N. 42° 26′, W. 50° 26′, passed several icebergs.

27th.—S. S. "Iowa," in N. 41° 42′, W. 47° 51′, passed a large iceberg.

29th.—S. S. "Devon," at New York reported, in N. 44° 00′, W. 46° 10′, saw three icebergs.

30th.—Ship "Jas. Drummond," in N. 43°, W. 51°, passed a large iceberg.

No date.—Bark "Dronning Sophie," from N. 48°, W. 43°, to N. 43°, W. 53°, passed numerous icebergs; ship "Thos. Rand," in N. 41° 46′, W. 49° 29′, passed a very large iceberg.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada, for the month of April, 1883, is exhibited on chart iii., by the dotted isothermal lines.

The general distribution of mean temperature during April, and the districts of maximum departures from the April normal of each year, beginning with 1873, are as follows:

Year.	Districts.	Max. departures from normal.	Remarks.
		°	
1873			The temperature was from 3° to 8° below the normal at stations from Kansas and Missouri to Minnesota; from 0°.5 to 5°.7 below in the middle Atlantic states and lake region; from 0°.5 to 3° below in New England and from Kentucky to the Gulf; about normal in the south Atlantic states.
1874	Upper Mississippi valley	−11.5	Below the normal in all districts, except in the south Atlantic states.
	Lower Mississippi valley	− 8.4	
	South Atlantic states	+ 1.1	
1875	Middle Atlantic states	− 6.8	Month unusually cold in all districts east of the Rocky mountains; temperature above the normal on the Pacific coast.
	Saint Lawrence valley	− 6.6	
	Lower lakes	− 4.4	
	Pacific coast	+ 2.6	
1876	Upper lakes	+ 2.5	Slightly below the normal on the Atlantic coast, in the lower lake region and Saint Lawrence valley; slightly above the normal in the Gulf states, the upper lake region, and and in the Missouri and Ohio valleys; normal in the upper Mississippi valley.
	Missouri valley	+ 1.5	
	Lower Lakes	− 1.5	
	Pacific coast	− 1.4	
	New England	− 1.3	
1877	New England	+ 4.5	Normal on the Pacific coast and in the Gulf states; slightly below the normal in the south Atlantic states; above the normal in the other districts, the departures being most marked from the upper Missouri valley to New England.
	Lake region	+ 3.4	
	Upper Missouri valley	+ 3.1	
	South Atlantic states	− 0.8	
1878	Upper lakes	+10.5	Month generally warm in all parts of the country. The greatest departures from the normal temperature occurred from the upper Missouri valley to New England. Over the Southern states and on the Pacific coast the departures are small.
	Lower lakes	+10.8	
	Minnesota	+ 9.1	
	Upper Missouri valley	+ 9.0	
	New England	+ 8.1	
1879	Northern slope	+ 6.0	Above the normal in all districts west of the Mississippi river, except in Arizona; below the normal east of the Mississippi, except normal in the upper lake region.
	Missouri valley	+ 5.1	
	Saint Lawrence valley	− 2.9	
	Florida	− 2.0	
1880	Middle Atlantic states	+ 4.0	Above the normal from Texas and the Mississippi valley eastward, except in the Saint Lawrence valley and the Canadian maritime provinces; below the normal west of the Mississippi, except in Texas and the middle slope.
	Eastern Gulf	+ 3.8	
	Western Gulf	+ 3.6	
	Missouri valley	− 3.2	
	Middle Pacific coast	− 3.0	
	Saint Lawrence valley	− 2.0	
1881	Missouri valley	− 3.6	Above the normal from the eastern Rocky mountain slope to the Pacific coast; below the normal in all other districts, except normal in the west Gulf states.
	Minnesota	− 3.4	
	Upper lakes	− 2.9	
	Upper Mississippi valley	− 2.9	
	South Atlantic states	− 3.5	
	North Pacific coast	+ 4.0	
	Southern plateau	+ 4.6	
	Middle Pacific coast	+ 3.6	
1882	Eastern Gulf	+ 3.2	Above the normal over the southern slope, the Missouri valley, and from the Mississippi eastward, except slightly below in New England; below the normal over the northern and middle slopes and west of the Rocky mountains.
	Tennessee	+ 2.8	
	Florida	+ 2.6	
	Middle plateau	− 4.7	
	Middle Pacific coast	− 3.4	
	North Pacific coast	− 3.1	

The mean temperature of the month over the United States, as a whole, differs but slightly from the April normal, as determined from the records of the Signal Service. From the eastern Rocky mountain slope westward to the Pacific coast the mean temperature is from less than 1° below the normal in the northern and middle slopes to 4°.6 below the normal in the middle plateau. In the lower lake region, the middle and south Atlantic states the mean temperature is also slightly below the normal, the departures being 1°.3 in the lower lake region, and less than 1° in the last-named districts. From the Gulf of Mexico to the northern boundary of the United States and in New England the mean temperature of the month is above the normal. Over this extended area the departure from the normal temperature is greatest in the Missouri valley, where it is 2°.6. In the extreme northwest, Tennessee, the upper Mississippi valley and in Florida the departures are 1°.2, 1°.3, 1°.4 and 1°.7 above the normal respectively. In the Gulf states, Ohio valley, upper lake region and in New England the departures above the normal are less than 1°.

The following are some of the extreme monthly mean temperatures reported from Signal-Service stations:

Stations reporting highest.	°	Stations reporting lowest.	°
Key West, Florida	79.2	Pike's Peak, Colorado	12.1
Rio Grande City, Texas	77.9	Mount Washington, New Hampshire	20.0
Punta Rassa, Florida	75.1	Saint Vincent, Minnesota	34.0
Brownsville, Texas	74.3	Alpena, Michigan	35.1
Eagle Pass, Texas	73.7	Mackinaw City, Michigan	35.9
Cedar Keys, Florida	72.6	Escanaba, Michigan	36.2
Sanford, Florida	71.8	Marquette, Michigan	36.5
New Orleans, Louisiana	71.4	Cheyenne, Wyoming	37.1
Indianola, Texas	71.3	Eastport, Maine	38.0
Galveston, Texas	70.6	Fort Stevenson, Dakota	38.0

In the first column of the following table is shown the mean temperature of April in previous years for the several districts, as determined from observations made at the Signal Service stations; the second column shows the mean temperature of April, 1883, and the third column shows the departure of April, 1883, from the normal.

Average Temperatures for April, 1883.

Districts.	Average for April. Signal Service observations.		Comparison of April, 1883, with the average for several years.
	For several years.	For 1883.	
	°	°	°
New England	43.2	43.5	0.3 above.
Middle Atlantic states	50.6	50.1	0.5 below.
South Atlantic states	62.0	61.7	0.3 below.
Florida peninsula	72.4	74.2	1.8 above.
Eastern Gulf	65.5	66.3	0.8 above.
Western Gulf	66.9	67.4	0.5 above.
Rio Grande valley	72.8	73.1	0.3 above.
Tennessee	59.6	60.9	1.3 above.
Ohio valley	53.7	54.4	0.7 above.
Lower lakes	42.9	41.6	1.3 below.
Upper lakes	39.5	40.1	0.6 above.
Extreme northwest	37.3	38.5	1.2 above.
Upper Mississippi valley	50.9	52.3	1.4 above.
Missouri valley	48.2	50.8	2.6 above.
Northern slope	43.5	43.4	0.1 below.
Middle slope	51.6	50.7	0.9 below.
Southern slope	64.8	62.2	2.6 below.
Northern plateau	48.3	45.5	2.8 below.
Middle plateau	48.5	43.9	4.6 below.
Southern plateau	59.4	56.3	3.1 below.
North Pacific	50.2	48.2	2.0 below.
Middle Pacific	57.7	54.9	2.8 below.
South Pacific	61.7	59.6	2.1 below.
Mount Washington, N. H.	20.6	20.0	0.6 below.
Pike's Peak, Colo.	13.1	12.1	1.0 below.

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal-Service stations are shown in the table of average temperatures for April, 1883.

The Chief Signal Officer is indebted to voluntary observers for the following notes upon this subject. As some of these comparisons are made with the averages determined from records covering periods extending back many years before the establishment of the Signal Service, they will be found of special interest.

Illinois.—Riley: mean temperature 44°.9, is 0°.8 above the April average of the past twenty-two years.

Anna: mean temperature 58°.3, is 0°.4 above the April average of eight years.

Indiana.—Vevay: mean temperature 57°.4, is 1°.2 above the April average of seventeen years.

Wabash: mean temperature 50°.5, is 0°.2 above the April average of seven years.

Kansas.—Lawrence: mean temperature 57°.2, which is 3°.2 above the April average of fifteen years.

Wellington: mean temperature 54°.1, is 2°.9 below the April average of the last four years.

Clay Centre: mean temperature 56°.6, is 1°.4 above the April mean of the last three years.

Maine.—Gardiner: mean temperature 39°.7, is 1°.6 below the April average of forty-seven years.

Maryland.—Fallston: mean temperature 48°.7, is 1°.1 below the April average of the last twelve years.

Sandy Springs: mean temperature 48°.9, or the coldest April since 1875.

Table of Comparative Maximum Temperatures for the Month of April.

State or Territory.	Maximum for April, 1883, Signal Service.		Highest since Signal-Service stations were opened—3 to 12 years.			Highest from any other source.			
	Station.	Temp.	Station.	Temp.	Year.	Place.	Temp.	Year.	Length of Record.
		°		°			°		
Alabama	Mobile	90	Mobile	90	1881	Mount Vernon Arsenal	95		34 years
Do	Montgomery	88	Montgomery	90	1880				
Arizona	Phœnix	99	Yuma	105	1876	Fort Lowell	109	1879	12 "
Do	Fort Apache	78	Phœnix	105	1881	Fort McDonald	106	1879	14 "
Arkansas	Fort Smith	88	Little Rock	94	1880	Fort Smith	96		21 "
Do						Mount Ida	95	1880	8 "
California	Los Angeles	89	Campo	94	1876	Fort Yuma	100		31 "
Do	Visalia	81	Los Angeles	94	1881				
Colorado	West Las Animas	82	Denver	83	1874	Fort Lyon	98		21 "
Do	Denver	73	West Las Animas	83	1882				
Connecticut	New London	66	New Haven	75	1880	New Haven	85		86 "
Do	New Haven	64	New London	74	1880	Middletown	85		11 "
Dakota	Huron	79	Fort Buford	92	1881	Fort Sully	98		17 "
Do	Fort Stevenson	74	Fort Sully	93	1874	Fort Randall	95		23 "
Delaware	Delaware Breakwater	67	Delaware Breakwater	89	1880	Fort Delaware	85		45 "
Dist. of Columbia	Washington	76	Washington	87	'73, '81	Washington	91		49 "
Florida	Cedar Keys	90	Jacksonville	91	'74, '80	Osahumpka	99	1880	4 "
Do	Sanford	90	Key West	91	1881	Fort King	94		10 "
Georgia	Augusta	87	Augusta	90	1880	Augusta Arsenal	94		50 "
Do	Atlanta	83	Savannah	89	1873	Savannah	94		37 "
Idaho	Lewiston	74	Lewiston	86	1880	Fort Lapwai	85		19 "
Illinois	Springfield	85	Cairo	84	1873	Rock Island Arsenal	89		11 "
Do	Chicago	78	Chicago	83	1873	Chicago	84		35 "
Indiana	Indianapolis	85	Indianapolis	83	1880	Vevay	97		14 "
Indian Territory	Fort Reno	91	Fort Sill	90	1880	Fort Sill	97		19 "
Do	Fort Supply	90	Fort Gibson	93	1881				
Iowa	Des Moines	89	Des Moines	84	'79, '80	Iowa City	90		15 "
Do	Dubuque	80	Dubuque	84	1879	Glenwood	92	1880	2 "
Kansas	Leavenworth	86	Leavenworth	89	1880	Fort Leavenworth	102		52 "
Do			Dodge City	92	1880	Fort Larned	90		18 "
Kentucky	Louisville	88	Louisville	87	'73, '80	Newport Barracks	89		30 "
Louisiana	Shreveport	92	New Orleans	85	1879	Fort Jessup	98		23 "
Do	New Orleans	84	Shreveport	93	'80, '82	Baton Rouge	96		58 "
Maine	Portland	66	Eastport	63	1877	Fort Preble	90		60 "
Do	Eastport	60	Portland	78	1851				
Maryland	Baltimore	74	Baltimore	84	1881	Fort Washington	93		38 "
Do	Ocean City	74							
Massachusetts	Boston	74	Boston	80	1881	Williamstown	87		62 "
Do	Provincetown	60	Springfield	79	1881				
Michigan	Port Huron	81	Port Huron	79	1881	Fort Gratiot	94		22 "
Do	Alpena	65	Marquette	81	1877				
Minnesota	Moorhead	74	Saint Paul	82	'79, 82	Fort Ridgley	90		11 "
Do	Saint Paul	74	Breckenridge	80	1880	Fort Snelling	88		61 "
Mississippi	Vicksburg	86	Vicksburg	90	1881	Columbus	86		10 "
Do	Starkville	85				Fayette	89	1880	7 "
Missouri	Saint Louis	88	Saint Louis	87	1881	Jefferson Barracks	94		30 "
Do			Springfield	89	1882	Corning	94	1880	7 "
Montana	Glendive	82	Fort Custer	85	1881	Fort Shaw	93		13 "
Do	Fort Shaw	68	Fort Keogh	90	1881				
Nebraska	Omaha	88	North Platte	92	1880	Fort McPherson	99		8 "
Do	North Platte	79	Omaha	89	1880	Omaha	96		3 "
Nevada	Pioche	68	Pioche	80	1879	Fort McDermitt	90	1881	16 "
Do			Winnemucca	79	1881				
New Hampshire	Mount Washington	50	Mount Washington	49	1877	Concord	88		8 "
Do						Dartmouth College	86		18 "
New Jersey	Little Egg Harbor	69	Atlantic City	79	1878	Vinelad	88	1881	7 "
Do	Sandy Hook	68	Barnegat City	79	1880	Burnt Mills	88	1877	3 "
New Mexico	Fort Bayard	75	Fort Craig	97	1879	Fort Craig	104		25 "
Do	Santa Fé	69	La Mesilla	100	1879				
New York	Rochester	84	New York City	81	1877	Fort Niagara	94		54 "
Do	Oswego	76	Albany	80	1881	Ithaca	98		30 "
North Carolina	Sloop Point	84	Wilmington	92	1873	Fort Johnson	88		57 "
Do	Charlotte	82	Charlotte	85	'80, '81	Weldon	90	'78, '80	8 "
Ohio	Columbus	86	Cincinnati	85	1873	Cincinnati	93		36 "
Do	Cleveland	85	Columbus	83	1881	Marietta	90		53 "
Oregon	Portland	74	Umatilla	89	1880	Fort Dallas	90		15 "
Do			Portland	85	1880	Fort Haskins	90		8 "
Pennsylvania	Erie	86	Pittsburg	88	1878	Philadelphia	88		120 "
Do	Pittsburg	86	Philadelphia	82	1881	Carlisle Barracks	88		35 "
Rhode Island	Block Island	66	Newport	70	1877	Providence	82		35 "
Do	Narragansett Pier	66							
South Carolina	Charleston	82	Charleston	86	1873	Fort Moultrie	89		38 "
Do						Charleston	88		105 "
Tennessee	Memphis	88	Memphis	87	'73 '80 '81	Ashwood	89	1880	3 "
Do	Nashville	88	Chattanooga	88	'80, '82	Glenwood Cottage	89		11 "
Texas	Eagle Pass	101	Rio Grande City	109	1878	Fort Ringgold	114	1878	32 "
Do	Rio Grande City	101	Eagle Pass	105	1880	Fort McIntosh	108		27 "
Utah	Salt Lake City	72	Salt Lake City	83	1874	Kanab	88	1875	5 "
Do						Fort Crittenden	85		3 "
Vermont			Burlington	75	1881	Lunenburg	78		17 "
Do						Woodstock	78	1881	8 "
Virginia	Norfolk	80	Norfolk	89	1881	Accotink	96	1881	7 "
Do	Fort Myer	77	Lynchburg	91.5	1873	Fortress Monroe	91		55 "
Washington	Pomeroy	72	Olympia	82	1880	Fort Walla Walla	96		14 "
Do	Dayton	74	Dayton	91	1880				
West Virginia			Morgantown	89	1878	Wellsburg	88	1879	2 "
Do						Helvetia	86	1878	6 "
Wisconsin	Milwaukee	75	La Crosse	83	1879	Fort Crawford	91		26 "
Do	La Crosse	73	Madison	82	1879				
Wyoming	Fort Washakie	71	Cheyenne	80	1874	Fort Laramie	89		27 "

Michigan.—Litchfield: mean temperature 45°.4; month cold; vegetation backward.

Missouri.—The following extract is taken from the report of Professor Francis E. Nipher, Director of the Missouri Weather Service:

The average temperature of April has been 56°.7 at Saint Louis, which is about 0°.5 above the normal of Englemann's series. Since 1837, the mean April temperature has once reached 66°.8—in 1844, and in 1857 it fell to 44°.1—a range of 22°.7. The extremes during the last month have been: lowest, 32°.2 on the 24th; highest, 85°.6 on the 14th, which are very ordinary temperatures. In April, 1857, the lowest temperature recorded was, 18°.0; while in the years 1838, 1843, and 1855, the highest temperature recorded was 93°.

New York.—North Volney: mean temperature 40°.0, is 1°.2 below the April average of sixteen years.

Palermo: mean temperature 38°.5, is 2°.7 below the April average of the last thirty years.

Ohio.—Wauseon: mean temperature 45°.3, or 1° below the average of thirteen years.

Pennsylvania.—Dyberry: mean temperature 41°.4, is 0°.8 below the April average of seventeen years.

Texas.—New Ulm: mean temperature 69°.8, or 1°.2 above the April average of eleven years.

Utah.—Nephi: mean temperature 41°.7, which is below the mean of March, 1883.

Vermont.—Woodstock: mean temperature 38°.0, or 1°.2 below the April average of the last sixteen years.

Virginia.—Variety Mills: mean temperature 52°.9, is 1°.5 below the April average of six years.

West Virginia.—Helvetia: mean temperature 50°.3, or 1°.5 above the April average of seven years.

Washington Territory.—The following temperature record has been forwarded by Mr. J. Straight, of Walla Walla. It shows the monthly extremes and the monthly and annual mean temperatures at Walla Walla from January, 1872, to December, 1882:

Year.	January.			February.			March.			April.			May.			June.			July.			August.			September.			October.			November.			December.			Annual means.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
1872	52	9	28.3	65	13	35.1	63	33	51.6	74	30	50.3	87	34	60.7	86	54	65.5	98	49	72.4	95	53	70.0	90	47	61.5	79	27	55.7	63	—3	31.0	50	13	28.8	50.9
1873	61	23	39.3	51	16	36.0	57	33	47.5	83	34	51.8	83	39	59.8	91	49	68.2	100	57	77.0	98	65	74.0	93	41	63.7	83	27	50.3	71	17	44.8	50	—7	22.4	52.9
1874	60	13	40.0	55	13	37.2	70	27	43.3	82	33	54.8	87	40	61.1	85	47	65.2	98	50	72.5	95	48	67.2	90	40	60.6	77	27	52.0	55	15	36.4	55	16	35.3	52.1
1875	45	—29	13.0	57	2	28.0	62	24	44.1	83	20	55.6	76	45	59.1	90	47	65.3	100	54	74.5	98	50	72.5	79	47	63.5	77	47	58.3	69	11	40.1	57	28	45.0	51.6
1876	50	0	28.5	72	28	44.1	70	28	44.2	75	32	53.1	92	42	57.8	98	53	73.7	97	62	75.4	92	54	69.2	90	51	64.2	83	41	58.5	65	21	40.4	52	11	28.2	53.1
1877	68	8	36.2	67	24	44.8	74	27	50.3	82	42	57.4	84	49	62.3	93	57	66.8	103	58	77.7	98	58	77.0	90	40	61.6	75	26	50.9	59	24	45.2	63	22	35.7	55.5
1878	61	20	36.5	61	32	45.7	77	30	52.3	85	30	54.8	89	40	61.9	95	58	70.2	90	52	71.4	91	55	71.9	87	45	59.6	71	26	47.2	68	24	43.7	57	6	30.2	53.8
1879	54	3	30.0	61	13	35.8	75	28	50.0	80	32	52.2	80	45	59.0	84	50	63.6	98	52	70.7	87	44	55.7	89	48	64.1	80	22	49.7	57	22	37.9	57	12	33.2	50.2
1880	58	20	40.0	54	14	34.7	74	11	41.3	85	30	51.2	88	44	56.0	94	49	65.8	98	48	70.4	92	49	67.7	90	40	61.6	83	30	52.6	66	14	35.0	59	7	27.8	50.3
1881	42	5	24.2	64	6	36.1	79	28	51.5	80	33	54.9	85	34	58.8	85	48	63.8	98	50	69.0	94	51	66.4	85	40	58.8	65	22	48.0	62	15	37.1	59	25	38.0	50.6
1882	46	3	33.1	53	—2	34.7	70	24	42.7	85	35	49.6	86	35	56.9	96	55	68.1	100	53	72.8	104	50	70.6	90	35	61.8	66	32	47.3	57	16	36.3	57	12	39.6	51.1
Means	54.7	6.8	31.7	60.0	14.5	37.6	70.1	26.6	47.2	81.3	31.9	53.2	85.2	40.6	59.4	90.6	51.5	66.9	98.2	53.2	73.1	94.9	52.5	69.3	88.5	43.1	61.9	76.3	29.7	51.9	62.9	16.0	38.9	56.0	13.2	33.1	52.0

MONTHLY RANGES OF TEMPERATURE.

The monthly ranges of temperature have varied from 20° at San Francisco, California, and 21° at Key West, Florida, to 71° at Saint Vincent, Minnesota, and 79° at Fort Stevenson, Dakota.

The smallest monthly ranges are: San Francisco, California, 20°; Cape Mendocino, California, 21°; Key West, Florida, 21°; Galveston, Texas, 25°; Punta Rassa, Florida, 26°; Barnegat City, New Jersey, 29°; Indianola, Texas, 29°; Cedar Keys, Florida, 31°; New Orleans, Louisiana, 33°; Brownsville, Texas, 33°; Cape May, New Jersey, 34°; Provincetown, Massachusetts, 34°; Macon, North Carolina, 34°: Block Island and Point Judith, Rhode Island, 35°; Portsmouth, North Carolina, 35°; Savannah, Georgia, 35°; Sanford, Florida, 35°. The largest are: Fort Stevenson, Dakota, 79°; Saint Vincent, Minnesota, 71°; Glendive, Montana, 70°; Phoenix, Arizona, 69°; Erie, Pennsylvania, 68°; Moorhead, Minnesota, 68°; Port Huron, Michigan, 67°; Cleveland, Ohio, 66°; Rochester, New York, 66°; Fort Custer, Montana, 65°; West Las Animas, Colorado, 64°; Graham, Texas, 64°; Fort Buford, Dakota, 64°; Fort Shaw, Montana, 64°, Buffalo, New York, 64°; Alpena, Michigan, 63°; Fort Apache, Arizona, 63°; Fort Elliott, Texas, 62°; Fort Supply, Indian Territory, 61°.

The greatest daily ranges of temperature have varied in the different districts as follows:

New England.—From 20° at Block Island, Rhode Island, on the 26th, to 32° at Boston, Massachusetts, on the 10th.

Middle Atlantic states.—From 17° at Barnegat City, New Jersey, on the 27th, to 31° at Lynchburg, Virginia, on the 19th and 31° at Williamsport, Pennsylvania, on the 30th.

South Atlantic states.—From 19° at Charleston, South Carolina, on the 1st, to 30° at Augusta, Georgia, on the 13th.

Florida peninsula.—From 19° at Key West, on the 24th, to 20° at Cedar Keys, on the 18th and 26th, and 20° at Punta Rassa, on the 4th, 19th and 26th.

Eastern Gulf.—From 19° at New Orleans, Louisiana, on the 17th, to 30° at Mobile, Alabama, on the 26th.

Western Gulf.—From 19° at Galveston, Texas, on the 14th, to 40° at San Antonio, Texas, on the 16th, and 41° at Fort Smith, Arkansas, on the 16th.

Rio Grande valley.—From 30° at Brownsville, Texas, on the 23d, to 45° at Eagle Pass, Texas, on the 23d.

Ohio valley and Tennessee.—From 27° at Indianapolis, Indiana, on the 4th, to 34° at Knoxville, Tennessee, on the 21st.

Lower lakes.—From 29° at Oswego, New York, on the 9th, to 36° at Toledo, Ohio, on the 14th, and 39° at Buffalo, New York, on the 15th.

Upper lakes.—From 26° at Chicago, Illinois, on the 27th, to 34° at Port Huron, Michigan, on the 14th.

Extreme northwest.—From 33° at Moorhead, Minnesota, on the 27th, to 36° at Fort Stevenson, Dakota, on the 27th.

Upper Mississippi valley.—From 27° at Cairo, Illinois, on the 23d, to 39° at Des Moines, Iowa, on the 16th.

Missouri valley.—From 36° at Huron, Dakota, on the 16th, to 40° at Omaha, Nebraska, and Yankton, Dakota, on the 8th and 16th, respectively.

Northern slope.—From 29° at Helena, Montana, on the 15th, to 44° at Fort Washakie, Wyoming, on the 15th.

Middle slope.—From 30° on the summit of Pike's Peak, Colorado, on the 15th, and 34° at Denver, Colorado, on the 2d and 3d, to 51° at West Las Animas, Colorado, on the 2d.

Southern slope.—From 35° at Jacksboro', Texas, on the 16th, to 44° at Fort Stockton, Texas, on the 17th.

Southern plateau.—From 36° at Santa Fé, New Mexico, on the 15th, to 54° at Fort Apache, Arizona, on the 15th.

Middle plateau.—From 29° at Salt Lake City, Utah, on the 15th, to 33° at Pioche, Nevada, on the 18th.

Northern plateau.—From 34° at Eagle Rock, Idaho, on the 19th, to 36° at Lewiston, Idaho, on the 24th.

North Pacific coast.—From 34° at Roseburg, Oregon, on the 17th and 24th, to 36° at Portland, Oregon, on the 23d.

Middle Pacific coast.—From 16° at San Francisco and Cape Mendocino, California, on the 15th and 18th, respectively, to 34° at Red Bluff, California, on the 20th.

South Pacific coast.—From 33° at Visalia, California, on the 15th, to 40° at Yuma, Arizona, on the 29th.

Table of Maximum and Minimum Temperatures for April, 1883.

State or Territory.	Signal Service.			U. S. Army Post Surgeons, or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
		°	°		°	°
Alabama	Mobile	90	47	Mount Vernon Barracks	91	44
Do	Montgomery	88	41	Scottsborough	87	29
Arizona	Phœnix	99	30	Texas Hill	98	50
Do	Fort Apache	78	15			
Arkansas	Fort Smith	88	37	Mount Ida	84	32
Do				Texas Hill	85	39
California	Los Angeles	89	39	Kingsburg	105	36
Do	Visalia	81	36	Mammoth Tank	100	55
Do	Red Bluff	79	36	Summit	47	16
Do	Cape Mendocino	57	36	Cisco	56	18
Colorado	West Las Animas	82	19	Fort Lewis	64	12
Do	Pike's Peak	30	−13	Fort Garland	64	10
Do	Denver	73	22	Fort Lyon	80	22
Connecticut	New London	66	24	Southington	69	25
Do	New Haven	64	22			
Dakota	Huron	79	24	Fort Pembina	67	− 3
Do	Fort Stevenson	74	− 5	Fort Sully	83	23
Delaware	Del. Breakwater	67	31			
District of Columbia	Washington	76	26	Rock Creek Bridge	78	31
Do				West Washington	76	25
Florida	Cedar Keys	90	69	Limona	97	49
Do	Sanford	90	53	Waldo	93	48
Do	Pensacola	87	49	Live Oak	92	42
Georgia	Atlanta	83	36	Covington	89	41
Do	Augusta	87	42	Toccoa	88	32
Idaho	Lewiston	74	33			
Do	Eagle Rock	64	20			
Illinois	Springfield	85	30	Bunker Hill	87	26
Do	Chicago	78	28	Polo	79	23
Indiana	Indianapolis	85	30	Hanover	89	33
Do				Degonia Springs	89	30
Do				Bluffton	82	23
Do				Martinsville	87	23
Indian Territory	Fort Reno	91	33			
Do	Fort Supply	90	29			
Iowa	Des Moines	89	29	Indianola	90	30
Do	Dubuque	80	26	Cedar Rapids	78	25
Kansas	Leavenworth	86	33	Clay Centre	96	29
Do				Wellington	91	25
Kentucky	Louisville	88	35	Frankfort	85	31
Louisiana	Shreveport	92	46	New Iberia	97	45
Do	New Orleans	84	51	Amite City	89	40
Maine	Portland	66	22	Gardiner	65	14
Do	Eastport	60	17	Dexter	64	12
Maryland	Baltimore	74	30	Sandy Springs	77	22
Do	Ocean City	74	28	Emmittsburg	72	22
Massachusetts	Boston	74	22	Westborough	72	20
Do	Provincetown	60	26	Heath	63	10
Michigan	Port Huron	81	18	Swartz Creek	87	20
Do	Alpena	65	2	Traverse City	78	5
Do	Escanaba	50	2			
Minnesota	Saint Paul	74	19	Northfield	75	22
Do	Moorhead	74	6	Fort Snelling	79	12
Do	Saint Vincent	67	− 4			
Mississippi	Vicksburg	86	44	Hernando	89	38
Do	Starkville	85	40	Meridian	91	
Missouri	Saint Louis	88	32	Glasgow	93	
Do				Centreville		22
Montana	Glendive	82	12			
Do	Fort Shaw	68	4			
Nebraska	Omaha	88	32	De Soto	95	30
Do	North Platte	79	21	Fort Niobrara	89	9
Nevada	Pioche	68	17	Hot Springs	76	21
Do				Boca	60	15
New Hampshire	Mt. Washington	50	−10	Bristol	62	14
Do				Grafton	60	9
New Jersey	Little Egg Harbor	69	29	Vineland	80	26
Do	Sandy Hook	68	27	Freehold	71	24
New Mexico	Fort Bayard	75	25	Lordsburg	84	41
Do	Santa Fé	69	19	Fort Union	75	9
New York	Rochester	84	18	Plattsburg Bar'ks	54	8
Do	Oswego	76	16	Johnstown	65	1
North Carolina	Sloop Point	84	35	Goldsboro'	85	38
Do	Charlotte	82	34	Weldon	83	31
Ohio	Columbus	86	26	Portsmouth	95	34
Do	Cleveland	85	19	Wauseon	84	18
Oregon	Portland	74	36	Albany	74	38
Do				Fort Klamath	69	12
Pennsylvania	Erie	80	18	Dyberry	68	11
Do	Pittsburg	86	26	Blooming Grove	69	16
Do	Williamsport	73	23	Grampian Hills	76	16
Rhode Island	Narragansett Pier	66	23			
South Carolina	Charleston	82	45	Georges	89	37
Do				Florence	87	26
Tennessee	Memphis	88	39	Austin	90	31
Do	Nashville	88	35	Paris	87	28
Do	Knoxville	86	33			
Texas	Eagle Pass	101	43	Hearne	88	29
Do	Rio Grande City	101	52			
Do	Fort Elliott	90	28			
Utah	Salt Lake City	72	28	Ogden	78	28
Do				Nephi	71	22
Vermont				Woodstock	72	0.4
Do				Lunenburg	66	2
Virginia	Norfolk	80	37	Marion	83	32
Do	Fort Myer	77	22	Variety Mills	79	27
Washington	Dayton	74	31	Fort Canby	69	34
Do	Pomeroy	72	29			
West Virginia				Helvetia	86	30
Wisconsin	Milwaukee	75	23	Beloit	81	21
Do	La Crosse	73	21	Ripon	77	12
Wyoming	Fort Washakie	71	11	Fort Bridger	64	−15?

FROSTS.

In the various districts they were reported on the following dates:

New England.—1st to 5th, 7th to 12th, 14th to 16th, 18th to 30th.

Middle Atlantic states.—1st to 4th, 7th to 9th, 12th, 13th 16th, 18th, 29th, 21st to 30th.

South Atlantic states.—1st to 4th, 25th, 26th.

Tennessee.—3d, 4th, 17th, 25th, 26th, 30th.

Ohio valley.—1st to 5th, 8th, 9th, 16th, 17th, 20th, 21st, 23d to 26th, 28th to 30th.

Lower lakes.—1st to 4th, 6th to 13th, 16th, 17th, 20th to 30th.

Upper lakes.—1st to 12th, 14th, 16th to 30th.

Extreme northwest.—1st to 13th, 16th to 20th, 23d to 30th.

Missouri valley.—1st to 8th, 11th, 12th, 15th, 16th, 19th, 23d to 30th.

Northern slope.—1st to 7th, 9th to 16th, 19th, 21st to 31st.

Middle slope.—1st to 3d, 5th to 8th, 10th to 12th, 14th, 15th, 17th, 18th, 21st to 26th, 29th, 30th.

Southern plateau.—1st, 2d, 5th to 8th, 13th to 16th, 19th to 24th, 26th to 28th.

Middle plateau.—1st to 7th, 9th, 10th, 12th to 15th, 18th to 28th.

Northern plateau.—4th, 5th, 11th, 13th, 14th, 21st.

North Pacific.—6th, 10th, 12th to 14th, 16th, 24th to 26th.

Middle Pacific.—1st, 13th to 15th, 17th, 21st to 23d, 25th, 26th.

South Pacific.—Los Angeles, 14; Visalia, 13th, 14th; Poway, 14th, 15th, 25th.

Frosts were also reported in the following states, not included in the above:

New Hampshire.—Mount Washington, 1st to 15th, 18th to 30th.

Texas.—Fort Davis, 6th, 7th, 8th, 29th.

Alabama.—Green Springs, 25th, 26th; Auburn, 30th.

Arkansas.—Fort Smith, 2d, 16th; Mount Ida, 3d, 7th, 8th, 16th; Texas Hill, 2d, 3d, 7th, 8th, 16th, 25th.

The following reports, concerning injury to the vegetation by frosts, have been received:

Fort Verde, Arizona, 14th.—Very heavy frost occurred this morning, destroying all garden vegetables.

Wickenburg, Arizona, 16th.—All vegetables and nearly all of the fruit have been killed by the frost of this date. The temperature fell 28°. The Alfalfa grass crop, which was nearly ready for mowing, was badly damaged.

Springfield, Illinois, 24th.—The frost of this date caused much damage to vegetation in the surrounding country.

Memphis, Tennessee, 25th.—Garden vegetables were injured by the frost of this date.

Baltimore, Maryland, 26th—A very heavy frost occurred on this date, but owing the backwardness of the season but little damage resulted.

Petersburg, Virginia, 25th.—A severe frost occurred in this vicinity last night. Ice formed to a thickness of one-half inch. Fears are entertained for the safety of the fruit crop.

Wilmington, Delaware, 24th.—Reports from various points in this state and from the eastern shore of Maryland, state that the peach crop has suffered no material injury from the recent frosts.

Raleigh, North Carolina, 25th.—A heavy frost occurred throughout this section last night. It is feared that much damage will result to the tobacco plants.

Reading, Pennsylvania, 25th—It is feared that the fruit crop in this section was seriously injured by the heavy frost of last night.

Pittsburg, Pennsylvania, 30th.—The farmers from the surrounding country report that early vegetables and fruit were nearly all killed by heavy frost of this date.

ICE.

Ice formed in the various states and territories as follows:

Arizona.—Tucson, 14th.

California.—Salinas City, 15th.

Illinois.—Elmira, 20th, 29th; Rockford, 29th; Swanwick, 24th.

Indiana.—Indianapolis, 24th; Wabash, 20th, 21st, 24th, 25th, 29th, 30th: Laconia, 25th, 30th.

Iowa.—Cedar Rapids, 24th; Dubuque, 24th; Humboldt, 23d; Muscatine, 29th.

Kansas.—Holton, 23d; Pretty Prairie, 6th, 7th, 19th, 25th.

Maine.—Bangor, 21st, 22d; Portland, 21st.

Minnesota.—Saint Paul, 23d.

Nebraska.—Clear Creek, 6th, 11th, 26th; Genoa, 16th, 19th, 24th.

New Jersey.—Freehold, 25th, 26th.

New Mexico.—Santa Fé, 5th, 6th, 7th, 13th to 16th, 22d, 23d, 24th, 27th, 28th.

New York.—Buffalo, 30th; Friendship, 24th; Flushing, 25th, 26th; Kiantone, 23d.

Ohio.—Bethel, 24th, Cincinnati, 24th; Columbus, 24th; Margaretta, 24th, 29th; North Lewisburg, 24th, 25th.

Pennsylvania.—Catawissa, 25th, 26th, 27th; Chambersburg, 21st, 26th; Franklin, 25th, 26th; Pittsburg, 24th; West Chester, 25th.

Rhode Island.—Narragansett Pier, 26th.

Texas.—Fort Davis, 13th, 16th.

Virginia.—Johnsontown, 4th, 25th; Marion, 25th; Norfolk, 25th.

Wisconsin.—La Crosse, 23d.

PRECIPITATION.

[*Expressed in inches.*]

The distribution of rainfall over the United States and Canada, as determined from observations taken at more than six hundred stations, is exhibited on chart iv.

In the first column of the following table is given the average April rainfall in the various districts for several years; in the second column is given the average for April, 1883; and the third column shows the excess or deficiency of April, 1883, as compared with the average of previous years:

Average precipitation for April, 1883.

Districts.	Average for April. Signal-Service observations.		Comparison of April, 1883, with the average for several years.
	For several years.	For 1883.	
	Inches.	*Inches.*	*Inches.*
New England	3.79	2.78	1.01 deficiency.
Middle Atlantic states	3.50	4.54	1.04 excess.
South Atlantic states	4.57	6.50	1.93 excess.
Florida peninsula	3.03	2.96	0.07 deficiency.
Eastern Gulf	5.54	8.30	2.76 excess.
Western Gulf	4.48	5.25	0.77 excess.
Rio Grande valley	1.25	1.08	0.17 deficiency.
Tennessee	5.74	7.12	1.38 excess.
Ohio valley	3.60	4.21	0.61 excess.
Lower lakes	2.20	2.00	0.20 deficiency.
Upper lakes	2.27	1.74	0.53 deficiency.
Extreme northwest	1.67	1.26	0.41 deficiency.
Upper Mississippi valley	2.96	3.50	0.54 excess.
Missouri valley	2.91	3.17	0.26 excess.
Northern slope	1.17	1.60	0.43 excess.
Middle slope	1.18	1.96	0.78 excess.
Southern slope	1.12	0.85	0.27 deficiency.
Northern plateau	2.46	1.17	1.29 deficiency.
Middle plateau	1.72	2.03	0.31 excess.
Southern plateau	0.40	0.16	0.24 deficiency.
North Pacific	3.02	7.18	4.16 excess.
Middle Pacific	2.22	1.38	0.84 deficiency.
South Pacific	0.87	0.56	0.31 deficiency.
Mount Washington, N. H.	4.18	6.21	2.03 excess.
Pike's Peak, Colo.	3.87	1.68	2.19 deficiency.

Over the northern part of the country from the northern plateau to New England, in Florida, California, and over the southern part of the country from Arizona to western Texas, the rainfall of the month has been below the average of April. The departures in these districts are, in general, small, being less than 1.00, except in New England and the northern plateau. In all other districts the rainfall has been above the average, the area of excess embracing a large extent of country from the Atlantic and Gulf coasts westward beyond the Rocky mountains, and to the north Pacific coast. The heaviest rains of the month occurred in the north Pacific coast region and east Gulf states, where the departures from the average are 4.16 and 2.76, respectively. Large excesses also occurred in the south Atlantic states and Tennessee. At Olympia, Washington Territory, in the north Pacific coast region, the rainfall for the month was 7.72 above the April average of the five preceding years, while at Roseburg, Oregon, there was a slight deficiency.

The general distribution of rainfall during the month of April, since 1873, and the districts of maximum departures of each year from the April normal, are as follows:

Year.	Districts.	Maximum departures from normal.	Remarks.
1873	Illinois and Missouri	+ 3.06	Excessive over southern New England, the lower lake region, and from Indiana and southern Michigan to Iowa and southern Minnesota; deficient elsewhere east of the Rocky mountains.
	Western Gulf	− 3.87	
1874	Tennessee	+ 8.90	Large excesses from New England southwestward to the west Gulf states, resulting in disastrous floods in the lower Mississippi river. At Vicksburg, Mississippi, over sixteen inches fell in four days. The snowfall in New England was unusually heavy. From the lower lake region westward the rainfall was below the average.
	Western Gulf	+ 6.90	
	Eastern Gulf	+ 5.30	
	Upper lakes	− 2.20	
	Minnesota	− 1.20	
1875	Ohio valley	− 1.72	Deficient from the Ohio valley to the upper lake region and Saint Lawrence valley; excessive from the middle Atlantic to the west Gulf states, in Minnesota and the Missouri valley; normal in the upper Mississippi valley and in New England. At Fort Gibson, Indian Territory, 4.50 inches fell on the 30th.
	Lower lakes	− 1.34	
	South Atlantic states	+ 1.70	
	Eastern Gulf	+ 1.38	
1876	South Atlantic states	+ 2.35	Excessive in New England, from the south Atlantic to the west Gulf states, and in the upper Mississippi and Missouri valleys; deficient in the Ohio valley, lower lake region, and from Minnesota eastward to the Saint Lawrence valley, and also in the middle Atlantic states.
	Eastern Gulf	+ 1.50	
	Upper Mississippi valley	+ 1.35	
	Ohio valley	− 1.05	
	Lower lakes	− 0.65	
1877	South Atlantic states	+ 5.65	Deficient on the Pacific coast, in the lower lake region and Ohio valley; above the average in all other districts, being largely in excess in Tennessee and the south Atlantic states, where the rainfall was more than twice the normal value.
	Tennessee	+ 5.75	
	Eastern Gulf	+ 2.50	
	Missouri valley	+ 2.20	
	Ohio valley	− 0.85	
	San Francisco, California	− 1.54	
1878	Tennessee	+ 2.80	Deficient in the Ohio valley, middle Atlantic states, and at Portland, Oregon; excessive in all other districts, the departures being large in Minnesota, the upper Missouri valley, in Tennessee, and in the south Atlantic states.
	South Atlantic states	+ 2.61	
	Minnesota	+ 3.89	
	Upper Missouri valley	+ 2.34	
	Middle Atlantic states	− 0.39	
	Ohio valley	− 0.23	
1879	South Atlantic states	+ 2.78	Excessive in New England and in the south Atlantic and Gulf states; deficient in all other districts, except normal in California.
	Western Gulf	+ 2.60	
	Ohio valley	− 1.65	
	Upper Mississippi valley	− 1.62	
	Upper Missouri valley	− 1.60	
1880	Saint Lawrence valley	+ 2.43	Deficient in the Missouri valley, Tennessee, and from New England to the east Gulf states; excessive in the west Gulf states, the lake region, in the upper Mississippi, Ohio, and Saint Lawrence valleys, and on the Pacific coast. On the middle Pacific coast the rainfall was about five times as great as the normal value.
	Ohio valley	+ 1.55	
	Upper lakes	+ 1.49	
	Middle Pacific coast	+ 7.87	
	South Atlantic states	− 1.99	
	Florida	− 1.57	
1881	Upper Mississippi valley	− 1.58	Deficient in all parts of the country, except slight excesses in Florida and in the north Pacific coast region.
	New England	− 2.34	
	Middle Atlantic states	− 1.95	
	Western Gulf	− 1.93	
	Middle Pacific coast	− 1.93	
	North Pacific coast	+ 0.64	
	Florida	+ 0.30	
1882	North Pacific coast	+ 2.09	Excessive from the lower lake region westward to the Rocky mountains, in the north Pacific coast region, middle plateau, and in Florida; deficient in all other districts, except a very slight excess in the east Gulf states.
	Extreme northwest	+ 0.70	
	Upper lakes	+ 0.70	
	Tennessee	− 2.05	
	Western Gulf	− 1.73	
	New England	− 1.19	

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average precipitation for April, 1883. The Chief Signal Officer is indebted to the voluntary observers for the following notes upon this subject. As some of these comparisons are made with

Table of Excessive, Greatest, and Least Monthly Rainfalls.

STATION.	SPECIALLY HEAVY. Date.	Amt.	Duration	Largest Monthly. Amount.	SMALLEST MONTHLY. STATION.	Amt.
Alabama.					*Arizona.*	
Auburn	7	2.20		12.83	Benson	0.00
Do.	9	3.45			Casa Grande	0.00
Do.	23	4.41			Fort Bowie	0.00
Birmingham	1	2.05		11.22	Fort Thomas	0.00
Do.	23	4.30			Maricopa	0.00
Mount Vernon Barracks	4	3.38	11 h. 30 m.	11.18	Pantano	0.00
Do.	6, 7	3.24			San Carlos	0.00
Do.	8, 9	2.75			San Simon	0.00
Opelika	7	2.33		10.65	Tucson	0.00
Do.	9, 10	3.08			Wilcox	0.00
Do.	23	3.86			Yuma	t'ce
Tuscaloosa	23	3.60		9.71	Fort Grant	0.03
Calera	9, 10	2.60			Texas Hill	0.03
Do.	23	2.90			Fort Verde	0.12
Selma	9	2.50		8.48	Fort Apache	0.22
Montgomery	9	3.41		8.16	*California.*	
Unlontown	7	2.74		7.73	Indio	0.00
Do	9	3.15			Mammoth Tank	0.00
Mobile	9	2.59		7.25	Mojave	0.00
Do.	12	2.62			Newhall	0.00
Scottsboro'	22, 23	3.12		6.62	Raveuna	0.00
Demopolis	9	3.20		6.20	Spadra	0.05
Arkansas.					Anaheim	0.10
Little Rock	5, 6	4.65		8.92	San Fernando	0.13
Do.	21, 22	2.68			Los Angeles	0.15
Mount Ida	6	2.00		6.20	Byron	0.17
Delaware.					Marysville	0.30
Delaware Breakwater	22, 23	2.17			Tracy	0.30
Florida.					San Diego	0.31
Sanford	1, 2	4.01		8.44	Williams	0.38
Do.	23, 24	2.97			Brentwood	0.39
Fort Barrancas	3, 4	2.00		7.48	Turlock	0.40
Do.	9, 10	3.94			Merced	0.41
Pensacola	4	2.17		6.74	Colton	0.45
Do.	8, 9	2.00			Delano	0.50
Saint Augustine	1	2.54	15 hours	6.63	*Colorado.*	
Fernandina	23	3.12			Fort Lewis	0.43
Waldo	1	2.65			*Dakota.*	
Mayport	23	2.33			Fort Buford	0.48
Jacksonville	23	2.17	2 h. 5 m.		*Missouri.*	
Punta Rassa	4	2.05	2 h. 15 m.		Brunswick	0.50
Georgia.					*Montana.*	
Covington	9, 10	2.90		10.93	Glendive	0.07
Do.	23	6.30			Fort Missoula	0.15
Thomasville	7	2.65		10.63	Fort Maginnis	0.39
Do.	23	3.70	1 hour		Fort Assinniboine	0.43
Newman	23	4.60		10.45	*Nebraska.*	
Bainbridge	10	2.90		9.80	Plattsmouth	0.32
Do.	23	3.20			*Nevada.*	
Forsyth	10	3.94		9.59	Reno	0.00
Do.	23	4.00	4 h. 30 m.		Hot Springs	0.10
West Point	9, 10	4.18		8.65	Elko	0.13
Atlanta	9	3.08		8.20	Browns	0.14
Do.	23	2.40	1 h. 40 m.		Wadsworth	0.18
Calhoun				7.06	Humboldt	0.35
Dalton	23	2.51		6.73	Carson City	0.39
Macon	9, 10	3.32		6.62	*New Mexico.*	
Albany				6.50	Deming	0.00
Augusta	9, 10	2.64	21h.45m	6.29	Lordsburg	0.00
Do.	23	2.53	3 h. 40 m.		Santa Fé	0.11
Griffin	9 10	3.45			Fort Union	0.22
Union Point	23	2.83			Fort Wingate	0.22
Savannah	9, 10	2.46			*Texas.*	
Do	10	2.18			El Paso	0.10
Illinois.					Fort Concho	0.12
Peoria	5, 6	2.71		6.18	Longview	0.32
Do.	23	2.60			Brownsville	0.38
Indiana.					*Utah.*	
Bluffton	6	2.00		7.53	Blue Creek	0.12
Do.	15	2.00			Ogden	0.47
Vevay	5, 6	3.10	24 hours	6.89		
Laconia	5, 6	2.85	12 hours	6.80		
Jeffersonville	6	3.20		6.18		
Evansville	5, 6	2.84				
Degonia Springs	5, 6	2.61				
Saint Meinrad	5, 6	2.45				
Corydon	5, 6	2.12				
Iowa.						
Des Moines	21, 22	2.12				
Kentucky.						
Bowling Green	22	3.02		7.60		
Louisville	5, 6	3.66		6.63		
Frankfort	6	3.09				
Louisiana.						
New Orleans	7	8.06		14.20		
Do.	8, 9	3.39				
Amite City				12.74		
Point Pleasant	6, 7	7.35		11.96		
Do.	22	2.01				
Monroe				6.21		
Maryland.						
Ocean City	22, 23	2.20				
Mississippi.						
Brookhaven	9	2.90		11.08		
Do	22, 23	2.71				
State Line	7, 8, 9	5.73		9.95		
Starkville	6	2.02		7.71		
Do.	9, 10	2.04				
Edwards	6	3.52		7.65		
Corinth	22, 23	3.40		7.07		
Vicksburg	6	4.25	7 h. 5 m.	6.99		
Hernando	21, 22	2.30				
Nebraska.						
Sutton				6.35		
Omaha	14	2.53	3 h. 15 m.			

Table of Excessive, Greatest, and Least Monthly Rainfalls.—Continued.

STATION.	SPECIAL HEAVY. Date.	Amt.	Duration	Largest Monthly. Amount.	SMALLEST MONTHLY. STATION.	Amt.
New Hampshire.						
Mount Washington				6.29		
New Jersey.						
Cape May	22, 23	2.51				
Vineland	23	2.05				
North Carolina.						
Portsmouth	16, 17	2.75		13.16		
Do.	23	4.00				
Murphy				9.75		
Highlands	22, 23	5.60	19 hours	9.65		
Brevard	22, 23	3.88		8.94		
Kittyhawk	23	3.04		8.78		
Lenoir	23	3.80		7.40		
Chapel Hill	22	4.19		7.35		
Weldon	23	3.81		6.79		
Hatteras	23	3.21		6.74		
Charlotte				6.05		
Sloop Point	23	3.12				
Smithville	23, 24	2.32				
Wilmington	23	2.25				
Lumberton	23	2.00				
Ohio.						
Portsmouth	5, 6	2.20				
Oregon.						
Portland				7.88		
Albany				6.58		
Eola				6.51		
Pennsylvania.						
Wellsboro'	19	2.16				
South Carolina.						
Columbia	9, 10	2.08		6.24		
Saint Matthews	23	3.76		6.14		
Spartanburg	23	2.03				
Tennessee.						
Paris	6	3.40		10.08		
Do.	22	4.38				
Nashville	5, 6	2.07		9.10		
Do.	22	5.03				
Grand Junction	22	4.99		8.89		
Austin	6	2.00		8.60		
Do.	22, 23	3.55				
Knoxville	22, 23	3.75	15h.40m.	8.17		
Murfreesborough	22	2.20		6.58		
Chattanooga	22	2.38		6.55		
Ashwood	21, 22	2.90		6.10		
Brownsville	22	2.08				
Virginia.						
Norfolk	16, 17	5.19	24 hours.	9.76		
Do.	23	2.23				
Cape Henry	16, 17	5.01	17h.5om.	9.72		
Hampton				8.30		
Fort Monroe	16, 17	2.98	21 hours	6.66		
Johnsontown	17	3.50	9 hours.	6.65		
Washington Territory.						
Fort Canby				6.52		
Wisconsin.						
Embarras	14	2.25				
West Virginia.						
Helvetia	4, 5	2.63		6.52		

the averages determined from records covering periods extending back many years before the establishment of the Signal Service, they will be found of special interest:

Illinois.—Riley: monthly rainfall, 2.00, is 0.67 below the April average of the last twenty-two years.

Anna: monthly rainfall, 5.75, is the largest April precipitation of the last eight years.

Indiana.—Vevay: monthly rainfall, 6.89, is 3.36 above the April average the last seventeen years.

Wabash: monthly rainfall, 3.60, is 0.61 above the April average of the last seven years.

Kansas.—Lawrence: monthly rainfall, 2.12, is 0.92 below the April average of the last fifteen years. The total precipitation for the four months ending April 30th, 1883, is 6.44, or 1.31 below the average of the corresponding months of the last fifteen years.

Yates Centre: monthly rainfall, 1.30, is 0.19 above the April average of the last three years.

Wellington: monthly rainfall, 2.06, is 0.26 below the average of the last four years.

Maine.—Gardiner: monthly rainfall, 3.46, is 0.10 above the April average of a peroid of forty-seven years.

Maryland.—Fallston: monthly rainfall, 2,76, is 0.54 below the April average of the last twelve years.

Missouri.—Saint Louis: Professor Francis E. Nipher, Director of the "Missouri Weather Service," reports the monthly rainfall at the "central station" to be 2.62, or 1.08 below the normal. At the Saint Louis water-works, the monthly rainfall was 3.87.

New York.—North Volney: monthly rainfall, 1.60, or 0.52 below the April average of sixteen years.

Palermo: monthly rainfall, 1.16, or 1.36 below the April average of the last thirty years. The monthly snowfall, 1.75, is 0.25 below the April average of the same period. During April 1874, 18 inches of snow fell, while no snow fell during April in eleven of the thirty years record.

Ohio.—Wauseon: monthly rainfall, 1.63, or 0.91 below the April average of ten years.

Pennsylvania.—Dyberry: monthly rainfall, 2.31, is 0.12 below the April average of fourteen years. The largest April rainfall of that period, 5.07, occurred in 1874; the smallest, 0.80, occurred in 1882. The total snowfall of the winter of 1882-3 is 69 inches, or about 3 inches more than the average of the last twenty-seven years.

Texas.—New Ulm: monthly rainfall, 2.54, is 1.56 below the April average of eleven years. The largest April precipitation of that period, 8.00, occurred in 1872; the smallest, 1.08, occurred in 1875.

Vermont.—Woodstock: monthly rainfall, 1.48, is 0.99 below the April average of the last fourteen years. The largest April snowfall of the last twenty-two years, 49 inches, occurred in 1874; no snow fell during April in 1866 and 1867. The snowfall of April, 1883, is 4.75 inches, or about 3.5 below the average of twenty-two years.

Virginia.—Variety Mills: monthly rainfall, 4.29, is 1.61 above the April average of four years.

Wytheville: monthly rainfall, 4.67, or 1.10 above the April average of a period of nineteen years.

West Virginia.—Helvetia: monthly rainfall, 6.72, is 3.05 above the April average of seven years.

Washington Territory.—The following table has been forwarded by Mr. James Straight, of Walla Walla, which shows the rainfall at that place during the years from 1873 to 1882, inclusive:

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual sums.	Monthly mean for each year.
1873	1.52	2.05	1.47	1.75	2.91	1.29	0.81	0.12	0.00	0.00	0.56	0.65	13.13	1.09
1874	1.52	1.98	0.59	1.89	1.10	1.12	0.00	0.54	0.05	0.41	2.09	0.55	11.84	0.99
1875	1.96	0.78	1.11	0.98	1.36	3.37	0.00	1.10	0.19	2.05	1.86	1.15	15.91	1.32
1876	0.35	0.77	0.73	3.16	1.78	0.62	0.27	0.47	0.51	4.37	4.12	1.16	17.32	1.44
1877	0.68	1.45	4.45	0.59	4.97	0.98	1.19	0.10	1.40	1.30	2.72	0.73	20.56	1.71
1878	1.23	2.24	1.53	0.16	2.17	0.09	0.67	0.68	1.29	2.68	0.79	1.31	13.64	1.14
1879	2.45	1.92	3.14	2.23	3.41	0.94	0.32	0.43	1.62	0.29	1.83	2.00	20.48	1.71
1880	1.61	0.49	1.07	2.01	1.54	0.98	0.54	1.29	0.17	1.21	1.00	4.90	17.71	1.48
1881	4.76	3.45	1.39	2.28	0.19	1.91	0.37	0.34	0.66	3.93	2.32	1.67	22.27	1.86
1882	0.78	2.27	1.30	3.22	1.57	0.78	0.67	0.10	0.99	3.20	2.10	3.89	20.87	1.74
Monthly mean for series	1.59	1.74	1.58	1.73	2.10	1.21	0.48	0.46	0.69	1.88	1.94	1.89	17.37	1.45

HAIL.

Alabama.—Mobile: a light fall of hail is reported to have occurred a few miles from this city, between noon and 1 p. m. of the 11th. On the 12th, at Spring Hill, six miles distant, hailstones fell as large as hen's eggs; no hail fell at Mobile.

Montgomery: a heavy fall of hail was reported from points three miles from this city on the 19th.

Arkansas.—Hot Springs, 28th: a most disasterous hail-storm occurred here at noon of this date. Many buildings were badly damaged, and hundreds of windows were broken.

Arizona.—Fort Verde: a heavy hail-storm occurred at this place between 1.20 and 2.15 p. m. of the 13th.

California.—San Francisco, 19th: hail fell in several parts of the city and at points on the opposite side of the bay. Hail also fell at San Rafael during the morning of the 12th.

Illinois.—Cairo, 28th: a hail-storm is reported to have occurred sixteen miles southwest of this city at 5 p. m.

Iowa.—Dubuque: during a thunder-storm on the 14th, a few large hailstones fell at 3.55 p. m.

Keokuk, 4th: hail fell for a few minutes during a thunder-storm at 9.25 a. m. A slight fall of hail also occurred at 3.40 p. m. of the 22d; and a severe hail-storm occurred at 4.35 p. m. of the same date, the hailstones covering the ground.

Muscatine, 15th: a hail-storm occurred at 3 p. m. of this date. The hailstones were as large as walnuts, breaking windows, etc.

Louisiana.—New Orleans, 29th: Reports from Arcadia, Bienville parish, state that during the afternoon of the 28th, that place and vicinity was visited by one of the severest hail-storms ever experienced there. The storm passed to the southeast, stripping the foliage from the tree, killing some stock and doing other damage within its track, which was from four to five miles in width. The ground was covered with hailstones, some of which weighed three-fourths of a pound, measuring eleven inches in circumference and four inches in diameter.

Michigan.—East Tawas, 14th: during a heavy rain and thunder-storm, hailstones of unusual size fell, some of them measuring three inches in diameter. Several residences were struck by lightning during the storm.

Missouri.—Archie, 22d: a heavy and destructive hail-storm passed over this place during the night damaging trees and crops.

Nebraska.—Peru, 13th: during the thunder-storm at 6 p. m., hailstones fell, measuring one inch in diameter.

Omaha: a hail-storm occurred at 4.35 p. m. of the 13th, the hailstones being of moderate size.

North Carolina.—Murphy, 6th: a heavy hail-storm occurred on this date, doing much injury to vegetation. Some of the hailstones weighed more than one ounce.

Oregon.—Portland, 12th: hail fell from 12.30 to 12.33 p. m. The hailstones were small, causing no damage to fruit or grain. Light showers of hail also fell on the 12th and 13th.

Texas.—Coleman City, 12th: hailstones, weighing about half an ounce, fell at 7.05 p. m., lasting six minutes.

Fort Davis, 8th: between 12.50 and 1.25 p. m., hailstones as large as hickory-nuts fell at points south and west of that station. During the storm on the evening of the 29th, which is described under the heading "Local Storms," the hail accompanying it was unprecedented in this locality. On the surrounding hills the ground was covered with hailstones to a depth of from three to four inches, of various sizes, some being as large as walnuts. But little hail fell at this station.

The dates on which hail-storms of less severity have occurred in the various states and territories are as follows:

Alabama.—Green Springs, 11th; Auburn, 19th, 22d.

Arizona.—Prescott, 20th; Fort Apache, 6th; Fort Verde, 20th.

Arkansas.—Mount Ida, 5th, 11th, 28th; Texas Hill, 11th, 21st, 28th; Fort Smith, 11th, 13th; Little Rock, 5th, 11th, 19th.

California.—Angel Island, 12; Fort Bidwell, 21st, 27th; Oakwood, 3d; Visalia, 12th.

Colorado.—Fort Lewis, 4th; Denver, 29th.

Dakota.—Fort Randall, 21st; Fort Lincoln, 11th; Morriston, 23d; Wicklow, 14th, 15th; Fort Bennett, 21st.

Florida.—Pensacola, 23d.

Idaho.—Fort Lapwai, 1st, 13th.

Illinois.—Anna, 23d; Morrison, 10th; Mattoon, 29th; Polo, 10th; Cairo, 11th.

Indiana.—Logansport, 23d; Indianapolis, 28th.

Indian Territory.—Fort Reno, 21st.

Iowa.—Cresco, 4th; Fort Madison, 4th; Guttenburg, 14th; West Bend, 13th; Muscatine, 12th; Des Moines, 13th, 22d; Indianola, 4th, 14th, 22d; Humboldt, 5th, 21st, 23d; Davenport, 5th, 6th; Burlington, 4th.

Kansas.—Independence, 11th; Wellington, 14th; Elk Falls, 14th.

Kentucky.—Bowling Green, 11th, 23d.

Maryland.—Fort McHenry, 23d.

Massachusetts.—Mendon, 7th; New Bedford, 24th; Worcester, 20th; Charlestown, 7th, 25th.

Minnesota.—Fort Snelling, 10th, 22d; Northfield, 10th, 22d.

Missouri.—Corning, 13th.

Montana.—Fort Missoula, 11th, 13th.

Nebraska.—Fort Niobrara, 11th, 21st; Clear Creek, 23d; De Soto, 13th, 14th, 21st; Genoa, 22d, 23d; Red Willow, 20th.

Nevada.—Fort McDermitt, 11th.

New Jersey.—Somerville, 27th; Moorestown, 13th; Vineland, 24th.

New York.—White Plains, 20th, 24th; Albany, 7th.

North Carolina.—Highlands, 6th, 22d; Weldon, 22d; Brevard, 6th, 22d; Wilmington, 24th.

Ohio.—North Lewisburg, 28th; Wauseon, 13th.

Oregon.—Albany, 13th; Roseburg, 11th, 13th.

Pennsylvania.—Franklin, 23d; Erie, 28th.

Tennessee.—Ashwood, 11th; Austin, 23d; Murfreesborough, 22d.

Texas.—Fort Davis, 7th; Indianola, 28th.

Utah.—Nephi, 9th, 23d.

Virginia.—Wytheville, 1st.

Washington Territory.—Fort Canby, 10th to 13th, 23d; Colfax, 4th, 8th, 9th; Spokane Falls, 11th, 13th, 22d.

Wisconsin.—Embarras, 10th; Ripon, 10th; Sussex, 10th, 22d; Milwaukee, 10th.

Wyoming.—Fort Bridger, 27th: Fort Supply, 27th.

In the following table are shown the greatest and least numbers of rainy (upon which rain fell) and cloudy days; the greatest and least percentages of mean relative humidity; and the highest and lowest dew-point means, as reported from the various districts, for the month of April, 1883:

Districts.	Rainy days	Cloudy days.	Rel. humidity. *	Dew-point
			Percentages.	° °
New England	From 10 to 15	From 5 to 12	From 57.8 to 81.1	From 28.5 to 36.9
Middle Atlantic states	" 12 " 19	" 5 " 14	" 55.8 " 81.5	" 31.0 " 46.8
South Atlantic states	" 10 " 16	" 5 " 17	" 68.8 " 85.0	" 47.2 " 60.6
Florida peninsula	" 2 " 13	" 0 " 8	" 70.6 " 70.8	" 62.7 " 68.1
Eastern Gulf	" 13 " 18	" 6 " 11	" 68.8 " 78.8	" 54.5 " 61.2
Western Gulf	" 7 " 16	" 5 " 18	" 61.6 " 78.3	" 46.0 " 63.4
Rio Grande valley	" 3 " 8	" 6 " 9	" 59.0 " 77.7	" 49.9 " 66.0
Ohio valley and Tenn	" 12 " 17	" 8 " 12	" 60.5 " 67.4	" 36.8 " 50.1
Lower lakes	" 12 " 16	" 6 " 11	" 58.3 " 72.2	" 39.1 " 34.3
Upper lakes	" 8 " 16	" 5 " 11	" 63.8 " 74.9	" 25.3 " 33.2
Extreme northwest	" 6 " 9	" 3 " 9	" 65.9 " 77.8	" 26.8 " 31.1
Upper Mississippi valley	" 11 " 15	" 7 " 12	" 55.7 " 62.4	" 30.6 " 40.0
Missouri valley	" 10 " 13	" 4 " 11	" 54.1 " 67.4	" 33.0 " 37.5
Northern slope	" 8 " 16	" 2 " 15	" 55.3 " 74.1	" 23.3 " 34.6
Middle slope	" 6 " 14	" 1 " 13	" 44.3 " 57.4	" 22.4 " 37.5
Southern slope	" 2 " 6	" 2 " 5	" 38.1 " 55.7	" 28.3 " 43.2
Southern plateau	" 0 " 6	" 0 " 5	" 31.4 " 44.1	" 14.2 " 30.8
Middle plateau	" 10 " 14	" 4 " 12	" 59.7 " 54.7	" 22.3 " 29.5
Northern plateau	" 8 " 18	" 3 " 14	" 58.3 " 69.0	" 25.6 " 35.1
North Pacific	" 19 " 20	Sixteen	" 67.5 " 74.3	" 37.6 " 40.6
Middle Pacific	" 8 " 17	" 1 to 5	" 58.3 " 85.3	" 39.6 " 44.4
South Pacific	" 1 " 7	" 0 " 5	" 47.9 " 68.4	" 43.9 " 46.2
Mt. Washington, N. H.	Twelve	Five	90.3	17.3
Pike's Peak, Col.	Nineteen	Six	85.7	8.4

* Relative humidity corrected for altitude.

SNOW.

The dates on which snow is reported to have fallen in the various districts are as follows:

New England.—1st, 5th to 8th, 11th, 12th, 13th, 19th, 20th, 22d to 30th.

Middle Atlantic states.—1st, 2d, 7th, 20th, 22d, 23d, 24th, 29th.

Ohio valley.—1st, 2d, 7th, 12th, 23d, 24th.

Lower lakes.—1st, 2d, 6th, 7th, 8th, 22d to 25th, 28th.

Upper lakes.—3d, 4th, 6th, 7th, 9th, 10th, 11th, 13th, 15th, 16th, 19th, 22d to 27th.

Extreme northwest.—1st to 4th, 13th, 14th, 15th, 18th, 21st, 22d, 30th.

Upper Mississippi valley.—1st, 2d, 3d, 5th, 6th, 7th, 10th, 12th, 22d, 23d, 24th.

Missouri valley.—1st, 2d, 3d, 5th, 6th, 9th, 10th, 14th, 22d, 23d, 24th.

Northern slope.—1st to 5th, 8th to 14th, 16th, 17th, 21st to 27th, 30th.

Middle slope.—4th, 5th, 7th, 13th, 14th, 21st to 24th, 26th, 27th.

Southern plateau.—4th, 6th, 13th, 14th, 20th, 21st, 23d, 24th.

Middle plateau.—1st to 26th, 29th, 30th.

Northern plateau.—1st, 2d, 3d, 6th to 16th, 21st, 22d, 23d, 25th, 26th, 28th.

On the summit of Pike's Peak, Colorado, snow fell on the 4th, 5th, 6th, 9th, 11th to 14th, 18th, 20th to 23d, 27th to 30th.

Other stations reporting snow, which are not included in the above named districts are:

Cape Mendocino, California, 12th, 13th. Sacramento, California, 13th, 14th. Fort Klamath, Oregon, 12th.

Unusually heavy snow storms for the season, have occurred as follows:

Saint Paul, Minnesota, 10th.—The severest snow storm of the season began during the afternoon of this date. Street railway travel was suspended on account of snow-drifts.

Minneapolis, Minnesota, 10th.—One of the severest snow storms of the season occurred here on this date. Street car travel was suspended for the first time this winter. The roof of a large building fell in from the weight of snow, during the afternoon.

Reports from Deadwood, Dakota, state that a severe snow storm began at that place on the night of the 12th, blockading the railroads and damaging the telegraph lines.

Omaha, Nebraska, 22d.—A snow storm began during the early morning of the 21st, and continued all day, blockading all the railroad tracks in the mountain region, although the snow-plows were actively used. The east-bound overland train, due to-day, arrived nine hours late.

Atchison, Kansas, 23d.—Trains between Denver, Colorado, and this place, encountered snow-drifts five feet deep, and were delayed ten hours.

Cheyenne, Wyoming, 21st.—Snow is drifted in places to depths of ten feet, causing suspension of travel. Trains on the Union Pacific railroad did not proceed west of Cheyenne, on account of snow-drifts. This storm was the severest that has been experienced in the territories since the notable storm of March 7th and 8th in 1878. The telegraph wires were prostrated in all directions. The storm continued until 9.30 a. m. of the 24th. Heavy losses in sheep and cattle are reported from many ranches.

Salt Lake City, Utah, 23d.—A severe snow storm began on the 22d. In the valleys the snow melted rapidly, but it formed heavy drifts in the railroad cuttings in the mountains.

Denver, Colorado, 23d.—The snow storm in the mountains continues with unabated severity. All trains are delayed. All available snow-plows were used to prevent a serious blockade.

LARGEST MONTHLY SNOWFALLS.

[*Expressed in inches.*]

The following are the largest monthly snowfalls reported from the various states and territories during the month:

California.—Cisco, 35; Summit, 34; Tehachapi, 16; Emigrant Gap, 14; Alta, 10.5; Colfax, 4.

Colorado.—Pike's Peak, 16.8; Fort Garland, 6; Fort Lewis, 4.3.

Connecticut.—Bethel, 6; Southington, 4.

Dakota.—Alexandria, 11.3; Fort Meade, about 7; Morriston, 4.5; Wicklow, 3.75.

Illinois.—Polo, 3; Riley, 3.

Maine.—Gardiner, 5.5; Dexter, 4.5; Cornish, 4.

Massachusetts.—Fall River, 8: Somerset, 4.4; Rowe, 4,

Michigan.—Northport, 5.3; Ionia, 5.25; Otisville, 3.5; Swartz Creek, 3.5; Lansing, 3.25.

Nebraska.—Fort Niobrara, 9.

New Hampshire.—Mount Washington, about 35; Woodstock, about 9; Wolfborough, about 6; Grafton, 5.5; Belmont, 5.4; Antrim, 4.2; Ashland, 4; Lake Village, about 4; Weir's Bridge, 3.

Nevada.—Otego, 22.25; Truckee, 21; Wells, 12; Toano, 11; Boca, 9; Tecoma, 6; Halleck, 3.

New York.—Friendship, 6.5.

Pennsylvania.—Grampian Hills, 9; Wellsborough, 3.6; Dyberry, 3.

Utah.—Nephi, 13.6; Salt Lake City, about 8.

Vermont.—Lunenburg, 10; Strafford, 8; Woodstock, 4.75; Newport, 4.5; Randolph, 4.

Wisconsin.—Sussex, 3.

Wyoming.—Cheyenne, about 20; Fort Bridger, 14.8,

DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[*Expressed in inches.*]

Colorado.—Pike's Peak, 24.

Maine.—Eastport, trace.

Massachusetts.—Rowe, in drifts.

Minnesota.—Saint Vincent, 0.2.

New Hampshire.—Mount Washington, 25; Grafton, drifts in places.

SLEET.

Colorado.—Fort Garland, 6th, 7th, 20th, 24th, 26th, 29th.

Connecticut.—New Haven, 22d.

Dakota.—Bismarck, 6th; Fort Bennett, 4th; Fort Meade, 14th; Fort Sisseton, 14th, 22d; Morriston, 1st; Yankton, 10th.

Illinois.—Chicago, 6th.

Indiana.—Indianapolis, 23d.

Iowa.—Davenport, 6th, 7th; Des Moines, 23d.

Maine.—Bangor, 27th.

Massachusetts.—Fort Warren, 8th.

Michigan.—Escanaba, 26th, 27th; Fort Brady, 11th; Grand Haven, 3d, 5th, 22d; Marquette, 17th, 19th.

Minnesota.—Saint Paul, 10th, 22d.

Montana.—Fort Shaw, 9th, 22d.

Nebraska.—Clear Creek, 23d; North Platte, 5th; Omaha, 23d.

New Hampshire.—Mount Washington, 5th, 6th, 11th, 19th.

New Jersey.—Freehold, 23d, 24th.

New York.—Fort Hamilton, 29th; New York City, 22d, 23d, 29th.

Ohio.—Canal Dover, 23d; Toledo, 7th; Wauseon, 22d.

Pennsylvania,—Blooming Grove, 22d; Chambersburg, 23d, 29th; Leetsdale, 22d.

Rhode Island.—Block Island, 23d; Point Judith, 23d, 24th.

Virginia.—Lynchburg, 1st; Marion, 24th; Variety Mills, 1st, 24th.

Wisconsin.—La Crosse, 10th, 22d.

SNOW FROM A CLOUDLESS SKY.

Keokuk, Iowa, 2d.—Between 7 and 8 a. m. light snow fell, while the sky was perfectly clear.

COTTON REGION REPORTS.

The temperature and rainfall observations which were made from April to October, 1882, in the cotton districts, were resumed April 1, 1882. In determining the averages for the various districts, as given in table below, reports have been used from the same stations, as were published in the REVIEW for April, 1882.

Meteorological Record of the Cotton Districts for the month of April, 1882.

Districts.	Average rainfall in inches.	Temperature.		Extremes.	
		Mean of the maxima.	Mean of the minima.	Highest.	Lowest.
		°	°	°	°
New Orleans	6.99	80.0	59.6	97	40
Savannah	5.65	80.5	58.0	94	33
Charleston	3.58	76.4	54.9	89	37
Atlanta	6.39	74.1	51.0	88	30
Wilmington	4.97	70.9	48.7	87	26
Memphis	6.93	74.9	52.7	90	28
Galveston	1.90	79.4	57.2	98	29
Vicksburg	7.92	76.9	55.6	89	39
Montgomery	8.73	78.2	53.7	91	28
Augusta	6.58	75.8	54.7	92	31
Little Rock	6.78	75.3	53.9	90	37.2
Mobile	7.80	80.9	57.1	91	36

WINDS.

The prevailing directions of the wind for the month of April, 1883, at the Signal Service stations are shown on chart iii., by arrows flying with the wind. It will be seen from this chart that the prevailing winds have been, with but few exceptions, variable in all of the districts. On the immediate California coast, they were from the west, except northwest at Cape Mendocino; and in Texas they were generally from the south.

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England	Block Island, R. I	9,625	New London, Conn.	4,330
Middle Atlantic states	Ocean City, Md.	11,392	Lynchburg, Va.	2,998
South Atlantic states	Hatteras, N. C.	13,551	Atlanta, Ga.	3,026
Florida peninsula	Punta Rassa	8,183	Sanford	4,904
East Gulf	Starkville, Miss.	6,577	Montgomery, Ala	3,506
West Gulf	Indianola, Tex.	11,722	San Antonio, Tex.	4,117
Rio Grande valley	Brownsville, Tex.	7,949	Eagle Pass, Tex.	4,328
Ohio valley	Louisville, Ky.	6,289	Pittsburg, Pa	3,713
Tennessee	Nashville	4,957	Memphis, Tenn.	4,717
Lower lakes	Toledo, Ohio	8,254	Oswego, N. Y	5,552
Upper lakes	Milwaukee, Wis.	10,225	Marquette, Mich.	5,664
Extreme northwest	Moorhead, Minn.	8,791	Saint Vincent, Minn.	5,338
Upper Mississippi valley	Keokuk, Iowa	8,313	Dubuque, Iowa	4,998
Missouri valley	Huron, Dak.	8,343	Fort Bennett, Dak.	5,720
Northern slope	North Platte, Neb.	9,256	Billings, Mont.	4,470
Middle slope	Fort Elliott, Tex.	10,742	Denver, Colo.	4,624
Southern slope	Fort Sill, Ind. T.	10,327	Fort Davis, Tex.	5,280
Southern plateau	Santa Fé, N. Mex	8,710	Tucson, Ariz.	3,408
Middle plateau	Pioche, Nev.	5,983	Salt Lake City, Utah	4,914
Northern plateau	Eagle Rock, Idaho	9,356	Lewiston, Idaho	2,440
North Pacific	Portland, Oreg.	4,028	Roseburg, Oreg.	3,202
Middle Pacific	Cape Mendocino, Cal.	*10,677	Sacramento, Cal.	5,933
South Pacific	San Diego, Cal.	5,798	Visalia, Cal.	3,150

* Record for eighteen days only.

On the summit of Mount Washington, New Hampshire, the total movement of the air was 23,900 miles, or 10,900 miles less than the total movement of the preceding month.

On the summit of Pike's Peak, Colorado, the total movement for the last eight days of the month was 3,102, no record having been kept during the earlier part of the month.

HIGH WINDS.

With the exception of the following dates; viz.: 7th, 13th, 14th, 15th, 17th, 23d, 24th, 29th, maximum wind velocities of fifty miles per hour or more were daily recorded on the summit of Mount Washington, the highest velocity of the month, eighty-eight miles from the southeast, occurring on the 11th.

At Cape Mendocino, California, the following high velocities occurred: 70 se., 1st; 88 se., 2d; 51 nw., 4th; 62 se., 7th; 92 se., 14th; 100 se., 15th. During a violent hurricane on the latter date, the anemometer cups were blown away, the self-register showing a velocity of one hundred and twenty miles per hour for the five minutes previous to the time of the breaking of the instrument. Violent gales also occurred at this place on the 18th and 19th.

Other high winds occurred during April as follows:—Cedar Keys, Florida, 50 sw., 50 se., and 71 s., on the 12th, 22d, and 23d, respectively; Fort Verde, Arizona, 60 sw., 12th; Portsmouth, North Carolina, 60 ne., 24th; Hatteras, North Carolina, 58 sw., 23d; Duluth, Minnesota, 52 ne., and 58 ne., on the 21st, and 22d, respectively; Fort Maginnis, Montana, 56 nw., 21st; Fort Sill, Indian Territory, 56 se., 21st; Bismarck, Dakota, 56 e., 21st; Indianola, Texas, 56 nw., 28th; Yankton, Dakota, 55 nw., 14th; West Las Animas, Colorado, 54 nw., 22d; Saint Paul, Minnesota, 53 se., 13th; Fort Shaw, Montana, 52 sw., 8th; North Platte, Nebraska, 52 se., 20th; Cape Henry, Virginia, 50 nw., 16th.

LOCAL STORMS.

On Sunday, April 22d, while the centre of the storm shown as viii., on chart i., was central in eastern Kansas, very violent tornadoes occurred in the states of Iowa, Mississippi, Alabama, and Georgia. The destruction of property was very great; and in Mississippi and Georgia, there were from two to three hundred lives lost, and about one thousand persons injured.

The reports of storms of local character which have occurred during April, arranged by states, are as follows:

Alabama.—Talladega, Talladega county, 23d: the heavy storm of last night did considerable damage in this community.

The north-bound train on the east Tennessee, Virginia and Georgia railroad was thrown from the track down an embankment. Near Springville, Saint Clair county, more than twenty houses were unroofed; one person was killed and several were wounded.

Arkansas.—Little Rock: during the night of the 5th a severe wind and hail-storm prevailed over the central and southern parts of this state, doing much damage to buildings and fences and blowing down many trees. Along the line of the Hot Springs and Malvern railroad, a passenger coach was lifted from the track and thrown down an embankment by the force of the wind. Two buildings were blown down at Alexander, Pulaski county. At Mablevale, ten miles south of Little Rock, the storm was especially severe. Several houses were blown down in that locality and the roads were rendered impassable by the fallen trees. Later reports from points beyond the Ouachita river, remote from the railroads and telegraph, show that great damage was done by this storm in that section. The destruction of houses and fences in the track of the storm was complete. Considerable loss of life was also reported.

At 11 p. m., of the 13th a tornado occurred in Franklin county, about fifteen miles west of Ozark. It first struck the farm of Mr. Henry Webb, where the buildings and fences were levelled to the ground, trees were uprooted and several persons were injured. Damage to the extent of $2,000 was done in this locality. Between midnight and 1 a. m. of the 14th, the tornado reached the town of White Oak, about six miles east of Mr. Webb's farm, where it was very violent. At this place four persons were fatally injured. Trees, three feet in diameter, were broken and twisted off, and a large number of green railroad-ties, which were piled up along the track, were scattered in all directions by the force of the wind. The telegraph lines were prostrated for a distance of four miles and the railroad track was broken in several places by the falling of heavy trees. The damage to property in Franklin county is estimated at $20,000, besides the loss of much valuable timber. Scarcely one tree was left on the sides of the mountains, which had been covered with timber. The average width of the storm's path was about three miles. It crossed the river about half a mile south of White Oak, thence it pursued a northeasterly course up White Oak creek, and passed off in a west-northwesterly direction. A heavy fall of large hail accompanied the storm, the hailstones being as large as hen's eggs.

At 3.15 p. m. of the 14th, a tornado struck the town of Conway, Faulkner county, on the Fort Smith and Little Rock railroad, causing damage to the extent of $50.000. Many buildings were blown down or unroofed, and several persons suffered bodily injury. The front of a house, which was not directly in the storm's path, was blown in, although the storm was moving away from it. The track of the storm was about three hundred yards wide and extended over the country for several miles both northeast and southwest of Conway.

British Columbia.—Victoria, 17th: four vessels were blown ashore at this port during the storm of the 16th; but there was but little or no damage done on shore. The wind blew with great force for fifteen hours.

Colorado.—Denver: during a storm in the mountains on the 21st, a passenger train on the South Park railroad was blown from the track, near Como, in Park county. The storm was very severe, the wind attaining a velocity of sixty miles per hour.

Pueblo, 21st: The worst storm ever known at this place began at 2 p. m., and continued until 10 p. m. Several houses were unroofed, and the streets were strewn with debris.

Georgia.—Americus, Sumpter county: between 3 and 4 p. m. of the 22d, a violent storm, accompanied by hail and rain, passed over the southwestern part of this county, and over the southeastern part of Webster county. As far as has been learned the storm did not extend farther than six miles north of Americus. It first struck a point about two and a half miles south of Botsford, in Sumpter county, where it blew down all buildings and fences in its path. A number persons were seriously injured, and some were killed.

Swainsborough, Emanuel county, 23d: a tornado passed through this county between 6 and 7 a. m. of this date, scarcely leaving a house standing in its track, and rendering several families homeless. Two persons are known to have been killed and several were injured.

Reports from Eastman, Dodge county, state that a tornado passed over that place during the early morning of the 23d, causing loss of life and property.

Augusta, 23d: a destructive storm is reported to have passed along the Athens branch of the Georgia railroad. Two dwellings near Woodville, Greene county, and Lexington, Oglethorpe county, were blown down, and also a large number of negro cabins and gin-houses in Lincoln and Taliaferro counties.

Atlanta, 23d: reports from Albany, Dougherty county, state that eight persons were killed and about twenty-five were wounded. The track of the storm in Dougherty county was about one-fourth of a mile in width. Loss of life and great damage to property by the storm are reported from Clark and Crawford counties.

Iowa.—Davenport, 14th: a very heavy thunder-storm occurred on this date, the wind reaching a velocity of forty-two miles per hour and blowing down chimneys, fences, trees, etc. On the morning of the 15th, the wind attained a velocity of thirty-eight miles, causing considerable damage. A severe storm occurred on the evening of the 22d, when a wind velocity of thirty miles was recorded. Sioux City: during the night of the 21st a severe storm passed over the eastern parts of Woodbury and Monona counties. A building near Correctionville, in Woodbury county, was carried a distance of eight rods, and was badly damaged. At Danbury, in the same county, a church was entirely destroyed, and numerous other buildings were blown down or otherwise damaged. Des Moines, 23d: reports from Dunlap, Harrison county, state that a tornado passed near that place on the night of the 21st, destroying many farm-houses and killing much stock. Trees were torn up by the roots and many small buildings were completely carried away; some loss of life was also reported. The track of the storm was northward through Monona and Woodbury counties. On the evening of the 22d, a tornado passed up Maple river valley, following the course of the Chicago and Northwestern railroad. At Danbury, in Woodbury county, a church was wrecked, three houses were blown down and other minor damages were inflicted.

Kansas.—Fort Riley, Davis county, 13th: between 7 and 8 p. m., a violent storm from the southeast passed over this place, unroofing and blowing down buildings. The clouds were very heavy and black, with continuous lightning and occasional thunder. The thermometer recorded 96° at 3 p. m.

Kingman, Kingman county: during the 20th, a strong wind blew steadily from the south, which at night increased in force. At midnight a tornado swept across the county, demolishing almost everything in its path. The storm struck with greatest force along the east and north line of Belmont township, destroying residences and scattering household effects. In the village of Waterloo, there were but one or two houses left standing. In this county, sixteen buildings of various kinds were blown down or injured, causing a loss of about $3.000.

The storm struck Sun City, Barbour county, at 2 a. m. of the 21st, destroying five houses. The loss was $5.000. At this place, two persons were killed, and three were wounded.

In Harper county, large quantities of hail fell, some of the stones measuring nine inches in circumference.

At Rome, Sumner county, the hail accompanying the storm destroyed the standing corn and caused other damage. Five buildings were blown down at South Haven. At Wellington, a large three-story building was unroofed; and at New Bedford, three houses were blown down, and one person was fatally wounded.

Minnesota.—Saint Paul: on the night of the 13th, a very severe storm visited Zumbrata Falls, Wabasha county, wrecking a bridge valued at $5,000, and a large number of buildings.

At Saint Paul, the wind attained a velocity of fifty-three miles per hour from the southeast from 9.14 to 9.39 p. m., blowing down awnings, signs, etc. The storm moderated during the night, but on the 14th, it again increased in force, the wind reaching a velocity of forty-one miles.

Mississippi.—Starkville, 11th: at 9.50 p. m., a thunder-storm accompanied by high wind and hail, visited this place. No damage occurred at this station, but at points twenty miles southward, trees, barns and gin-houses were blown down.

At 1.10 p. m., of the 22d, the wind, which had blown steadily from the southeast, veered to southwest and attained a velocity of thirty-seven miles per hour. About this time the severest storm ever experienced in this community passed in a northeasterly direction about two miles north of this station, sweeping everything before it. The cloud, as observed from this place, was of a decided greenish color, and seemed greatly agitated. It appeared to be about one-fourth of a mile in height, and was accompanied by brilliant electrical displays and rolling thunder. When the rain began the darkness became so great that the movements of the clouds were no longer discernible. The width of the tornado's track was about three hundred yards, and within it everything was levelled to the ground. The largest trees were twisted off or blown down.

On the north side of the storm-track the trees fell towards the south, and on the south side they fell towards the north, while near the centre they fell in all directions. In almost every instance, the trees on either side of the storm-track were blown over, while those within its path were twisted off at different heights, in many places from ten to twenty feet from the ground. Many of the trees appeared to have been twisted from right to left, but in one case a limb was split and a part of it was wound around the trunk from right to left, while the other part was wound from left to right. Within that part of of the storm's path visited by the Signal Service observer at Starkville, thirteen houses were entirely destroyed. One of the number, a small frame building, was blown away, the only mark of its former position being the four sills upon which it rested. The ruins of the other houses presented the appearance of having been torn to pieces by an explosion. No loss of life occurred in this vicinity, although several of the houses that were destroyed were occupied. Some buildings in close proximity to those completely demolished, escaped without injury. Only one life was lost in this locality.

At 3.15 p. m. of the 22d, the towns of Wesson and Beauregard, in Copiah county, were visited by a most violent and destructive tornado. At Wesson, a town of about 1,700 inhabitants, twenty-seven houses were destroyed; thirteen persons were killed, and sixty were injured. The total loss at Wesson, will exceed $20,000.

At Beauregard, a town of six hundred inhabitants, situated about one mile north of Wesson, every dwelling and store in the town were destroyed. Two rows of buildings on Railroad avenue were leveled to the ground, and goods valued at $150,000 were damaged to the extent of ninety per cent. Twenty-nine persons were killed, and about forty were more or less seriously wounded. The tornado lasted only about fifteen minutes. The force of the wind was such as to carry for a distance of three hundred yards, a solid iron screw of a cotton press, weighing six hundred and seventy-five pounds; and to drive through a red oak sappling, a piece of scantling three by four inches and ten feet in length. Up to April 28th, the damage at Beauregard by the tornado was estimated at $450,000.

At Tillman Station, Claiborne county, the storm was very violent, causing great damage to all property and some loss of life.

Clay county was visited by two tornadoes, one, about noon, passed over the western part of the county, and the other, about 1 p. m., passed over the central and southern parts. Both of them were very violent, causing loss of life and destroying buildings, trees and fences. At West Point, the tornado was accompanied by torrents of rain and the largest hail ever seen at that place. In Monroe and the neighboring counties lying northward, a number of persons were killed, and many others were injured. In Clay county, the course of the storm was from southwest to northeast, passing entirely through it, and totally destroying a negro settlement near Aberdeen.

Reports from Red Lick, Jefferson county, stated that a tornado passed about one mile east of that place at about 11 a. m. of the 22d, causing some loss of life and great damage to property. Everything in the track of the storm, which was about two hundred yards wide, was swept away. Ten persons were reported to have been killed at Harrisville, Simpson county, and seven were reported to have been killed near Morton, in Scott county.

In Lowndes county, a violent wind and rain storm from the southwest completely demolished all of the buildings on many of the plantations. At Caledonia, two persons were killed; every fence for miles around was swept away, and many trees and building were blown down.

The town of Lawrence, in Newton county, suffered heavy loss of property but no loss of life occurred.

The storm passed east of Natchez, Adams county, at about 10.30 a. m. On the opposite side of the river, in the lower part of Concordia parish, Lousiana, houses were unroofed, one person was killed and several wounded.

Reports from the town of Monticello, Lawrence county, which was almost destroyed by a tornado on April 21, 1882, state that at 11 a. m. the tornado passed about one mile east of that place, causing some loss of life and doing great damage. The track of the storm was about two hundred yards wide, within which everything was swept away.

Missouri.—Saint Louis: the following extract is taken from the April report of Professor F. E. Nipher, Director of the Missouri Weather Service: "At 4 p. m., on the 14th, a severe local storm, which was apparently an incipient tornado, did considerable damage at Hannibal. Its track was about three hundred feet wide. Similar storms, with hail, were observed seven miles west and ten miles north of Mexico. A small tornado, having a width of fifty to seventy feet, passed through the western part of Pleasant Hill, between 7.30 and 8 a. m. A part of a rail-fence was carried eight feet and set down without materially changing the relative position of the rails."

North Carolina.—Williamston, Martin county, 24th: considerable damage was done by the violent wind and rain storm which visited this section at about 2 a. m., of the 23d.

Boykins, Sampson county, 23d: a tornado occurred at 7 a. m., about three miles from this place on the Springhill road. The path of the storm was not more than one hundred and fifty yards in width, and its length was about four miles. The roads in its course were rendered impassable by being strewn with trees and debris. Many buildings were wrecked and several persons suffered bodily injuries. In one instance the flooring of a small house, which was fastened with large nails, was blown up, while the building was otherwise unharmed. It was impossible for the inmates to keep the doors and windows closed during the storm.

The duration of the tornado was not more than three minutes at this place.

Pennsylvania.—Williamsport, 19th: at 5.37 p. m., a severe squall with heavy rain lasting five minutes, did considerable damage to fences, trees, etc., in this locality. Two boats were capsized during the squall, drowning four of the occupants.

Ohio.—Cleveland, 12th: a tornado passed over Milan, Erie county, on the 11th, causing loss of life and property. The storm was the severest experienced in this locality for many years, but only a small section of country was visited by it.

Toledo, 11th: several buildings on the east side of the river were damaged by the storm of this date, but on the opposite side of the river, the damage was very slight.

A severe storm occurred on Lake Erie on the 23d, the wind, at Toledo, reaching a maximum velocity of forty-five miles per

hour, causing entire suspension of shipping business. The water in the river rose to a height of five feet above the ordinary level.

South Carolina.—Reports from Stateburg, Sumpter county, state that the tornado of the 23d appeared to have developed near Wateree swamp, first striking a point about one-half mile to the west of the old State road to Charleston. From this place it pursued a course nearly eastward for a distance of five miles, the width being about three hundred yards. Within the track of the storm but few trees were left standing. Along the northern border of the track for a distance of fifty or seventy-five yards, the trees, for the most part, fell from north to south; on the southern border for the same distance they fell from south to north, or from southeast to northwest, and along the centre they fell mostly in a direct line from west to east, while a few were observed to lie from east to west.

Charleston, 23d: In Barnwell county the tornado of this date cut a path three-fourths of a mile in width through the Saltkehatchie swamp, as cleanly as though the timbers had been felled for a railway. Within the storm's path residences and cabins and out-buildings were destroyed on many plantations. Many of the best fields have been so covered with trees and debris that they cannot be cleared in time to be cultivated this year. At Blackville, Barnwell county, a large amount of damage was done by the storm. Nearly everything in its track was blown away or badly damaged. The width of the storm's path was from one-half to three-fourths of a mile, and its duration was about ten minutes.

Bishopville, Sumpter county, 23d: about 8 a. m. of this date a violent wind and rain storm visited this section. The main track of the storm was about one hundred and fifty yards wide, within which trees and buildings were levelled to the ground, So far as has been learned the storm began about four miles west of this place and its track has been followed to Lynch's river.

Saint Stephen's, Berkelsy county, 23d: during the morning of this date a tornado passed through this section, damaging buildings and blowing down trees.

Darlington, Darlington county, 24th: a tornado coming from a northwest direction and pursuing a zigzag course to the south and east struck this county yesterday. Its track was narrow, and the wind seemed to blow from the borders of the storm towards the centre. Trees, fences and buildings were blown down. The storm was accompanied by vivid lightning, rain and small hail.

Tennessee.—Chattanooga, 22d: during the afternoon of this date a tornado passed over this city from southwest to northeast, its main track being about three hundred yards wide and two and one-half miles in length. Diverging from the main storm, a minor track, less than one hundred yards wide, swept around Cameron Hill, rejoining the main track in the northeastern outskirts of the city. The storm continued in full force from 4.40 to 5.10 p. m., with the wind veering rapidly from southeast to northwest, and finally coming around to east at night. The vortical motion of the tornado was clearly shown in the case of a partly finished building facing northeastward, which was twisted around to the right fully seven feet, and the trees, which also fell from west to east. A large number of buildings were unroofed or otherwise injured, and two cars on the railroad near the river were overturned. The damage to property in this city is estimated at $10,000.

Knoxville, 23d: The wind and rain storm of last night did but little damage in this locality. The fall of rain (3.75 inches) was the largest that has occurred in any one day at this place during the last five years.

Texas.—Sherman, Grayson county, 13th: an unusually severe wind storm struck this place about 12 o'clock last night, doing damage to the extent of several thousand dollars. Several houses were blown down and other were unroofed. The storm lasted for two hours and thirty minutes. Reports from Fort Worth, state that the storm was unusually severe at place.

Dallas, 28th: reports from Bell, Polo Pinto, Hood, Johnson and Fannin counties, state that a severe wind and hail storm passed over those counties during the evening of the 27th, doing great damage to crops, buildings and other property, and causing loss of life. The storm was also severe at Marshall, Harrison county, where several persons were injured. The hailstones in some places were reported to have been as large as hen's eggs. Among the buildings destroyed were the Masonic hall, the Conatre mills, and one residence. Nearly all of the windows in the town were broken. The storm passed four miles north of Benton, Atascosa county, demolishing houses and doing other damage. Four persons are reported to have been killed.

Fort Davis, 29th: at 4.40 p. m., a violent storm struck this place, blowing down and unroofing several buildings. During the storm the atmosphere was so charged with electricity that it became necessary to disconnect the telegraph instruments from the main line.

Virginia.—Richmond: a strong northeasterly gale prevailed here during the 16th and 17th, unroofing a number of buildings and blowing down many trees and fences. On the 22d, a very heavy rain storm occurred, accompanied by a strong northeast wind. The street cars stopped running at 9.30 p. m., on account of the severity of the storm.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for April, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 85.90 per cent. The percentages for the four elements are: weather, 88.72; direction of the wind, 79.43; temperature, 89.13; barometer, 86.14 per cent. By geographical districts, they are: For New England, 84.53; middle Atlantic states, 84.15; south Atlantic states, 86.83; eastern Gulf, 88.28; western Gulf, 88.43; lower lakes, 84.42; upper lakes, 84.60; Ohio valley and Tennessee, 85.48; upper Mississippi valley, 86.20; Missouri valley, 85.92; north Pacific, 92.86; middle Pacific, 81.73; south Pacific, 86.54.

There were sixty-seven omissions to predict (seventeen being due to the absence of reports from the Pacific coast) out of 3,690, or 1.80 per cent. Of the 3,623 predictions that have been made, ninety-four, or 2.59 per cent., are considered to have entirely failed; one hundred and twenty-two, or 3.37 per cent., were one-fourth verified; four hundred and twenty-nine, or 11.84 per cent., were one-half verified; four hundred and forty-four or 12.26 per cent., were three-fourths verified; 2,534, or 60.94 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During April, 1883, one hundred and twenty-four cautionary signals were displayed. Of these, one hundred and thirteen, or 91.1 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. Two cautionary off-shore signals were displayed, both of which were justified as to direction and velocity. One hundred and twenty-six signals, of all kinds, were displayed, of which one hundred and fifteen, or 91.3 per cent., were fully justified. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. Eleven signals were ordered late. One hundred and three winds of twenty-five miles or over per hour were reported, for which signals were not ordered; many of these were high local winds or strong sea-breezes.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The upper Mississippi river reached its highest stage from the 22d to the 30th, and was lowest during the first part of the month. It was fozen at Saint Paul, Minnesota, until the 6th,

and at La Crosse, Wisconsin, until the 4th. At Cairo, Illinois, the river was highest on the 15th, when it was four feet and three inches above the danger-line. At Memphis, Tennessee, the river was highest from the 20th to 24th, being within eight inches of the danger-line. At Vicksburg, Mississippi, the river fell slowly, but without interruption, after the 7th, but, at the close of the month was still one foot, four inches above the danger point. On the 7th, the river at New Orleans, Louisiana, rose to high-water mark of 1874, and reached its lowest stage on the 27th and 28th, when it was still one foot above the danger-line.

The Ohio river was highest at Pittsburg, Pennsylvania, on the 8th, and at Cincinnati, Ohio, and Louisville, Kentucky, on the 9th, but it did not approach the danger-line at these stations.

The water in the Missouri river was highest from the 18th to 20th and lowest on the 30th.

The Tennessee river rose to within six inches of the danger-line on the 26th, reaching its highest stage on the date.

The Cumberland river at Nashville, Tennessee, rose seventeen feet and three inches during the 22d and 23d, causing serious damage to bridges and railroads.

The highest and lowest stages of water observed at the Signal Service stations during the month of April, 1883, are shown in the following table:

Heights of rivers above low-water mark, April, 1883.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.	
		Date.	Height.	Date.	Height.
Red River:	ft. in.		ft. in.		ft. in.
Shreveport, La	29 9	23, 24	23 4	3	19 8
Arkansas:					
Little Rock, Ark	30 0	8	11 7	5	4 4
Fort Smith, Ark	.....	9	0 11	28	*—3 4
Missouri:					
Yankton, Dak	20 0	18	9 5	30	4 3
Omaha, Nebr	16 0	18, 19	13 4	30	7 10
Leavenworth, Kans	21 0	20	14 5	30	9 6
Mississippi:					
Saint Paul, Minn.†	14 6	22	12 6	9	6 5
La Crosse, Wis.†	18 0	22	10 11	6, 7	4 0
Dubuque, Iowa	21 10	27, 28, 29	16 8	2	5 4
Davenport, Iowa	15 0	30	13 1	3	4 4
Keokuk, Iowa	14 6	30	12 4	4	6 6
Saint Louis, Mo	30 0	23	20 7	6	15 2
Cairo, Ill	40 0	15	44 3	1	26 9
Memphis, Tenn	34 0	20 to 24	33 4	1	19 7
Vicksburg, Miss	41 0	6	43 10	30	42 4
New Orleans, La.‡	—2 6	7, 9	0 0	27, 28	—1 3
Port Eads, La	.....	.....	.....	.....	.....
Ohio:					
Pittsburg, Pa	30 0	8	16 11	5	6 7
Cincinnati, Ohio	50 0	9	46 3	17	27 3
Louisville, Ky	24 0	9	22 5	18	10 8
Cumberland:					
Nashville, Tenn	42 0	7	36 0	21	14 1
Tennessee:					
Chattanooga, Tenn	33 0	26	32 6	22	11 1
Monongahela:					
Pittsburg, Pa	29 0	8	16 11	5	6 7
Savannah:					
Augusta, Ga	30 0	11	27 6	21, 22	8 4
Willamette:					
Portland, Oreg	.....	1	10 7	29	6 10
Umatilla, Oreg	.....	.....	.....	.....	.....
Sacramento:					
Red Bluff, Cal	.....	3	9 0	29	2 8
Sacramento, Cal	.....	9	19 9	29	16 3
Mobile:					
Mobile, Ala	.....	22	18 6	2, 16	15 6
Colorado:					
Yuma, Ariz	.....	7	18 6	23, 24	17 5

*Below bench-mark. ‡ Below high-water mark of 1874.
† Observations incomplete. See text.

FLOODS.

The heavy rains of the month have resulted in destructive freshets in many of the states; and in the Canadian Provinces and New England, where the monthly precipitation was below the average, the melting of the winter snowfall caused the rivers and streams to rise to heights which proved damaging to property. From the following will be seen the extent to which floods have prevailed in the various districts during April, 1883:

Arkansas.—Helena: the heaviest rain known for years fell in this vicinity on the 21st. Six inches of rain fell in as many hours, flooding a large part of the city. During the night of the 18th, a partly repaired levee gave way, submerging a large area of valuable cotton land, which, owing to the inundation, will not be cultivated this year.

Georgia.—Atlanta, 25th: reports from Franklin, Head county, state that during the night of the 22d, Hillatchie creek, six miles from Franklin, rose suddenly, sweeping away a house on its banks and drowning several of the occupants.

Iowa.—Des Moines, 6th: the railroad bridge at this place was damaged by the high water in the Des Moines river on this date.

Kentucky.—Louisville, 5th: a very heavy rain storm began at 9.10 p. m., and at 10.25 p. m. the rainfall measured 2.10 inches, of which amount 2.00 inches fell in one hour and fifteen minutes. In different parts of the city cellars were flooded and the water rose above the first floors of some buildings, doing considerable damage.

Louisiana.—New Orleans, 7th: a very heavy rain storm began at 6.20 a. m. During the succeeding four hours, there fell 5.63 inches of rain, and during the twenty-four hours ending at 10.08 p. m., 8.06 inches, which is the heaviest rainfall on the records of the signal office in this city since its establishment in 1870. On this date the river rose to the highest point reached by the flood in 1874. Great difficulty was experienced by the steamers in delivering freight. The town of Gouldsborough was inundated from three to five feet. The track of the Algiers and Gouldsborough dummy line was washed away. The water overflowed the levee from Harvey's canal to a point opposite Canal street, flooding a large part of Algiers and causing much damage. A break one hundred and fifty feet wide and seven feet deep occurred in the levee near the Texas and and Pacific railway at Gouldsborough.

Minnesota.—Saint Vincent: during the 21st the Red river rose rapidly, overflowing its banks in several places.

Mississippi.—Vicksburg 6th: very heavy rain began at 10.25 a. m., and continued until 3.25 p. m., during which time 4.21 inches of rain fell, and from 10.55 p. m. to 11.55 p. m., about 2.00 inches fell. Many bridges were washed away and other damage done.

Jackson, 6th: the heaviest rain of the year fell on this date. Bridges in some parts of the city have been washed away.

Missouri.—Cape Girardeau, Cape Girardeau county, 23d: trains were delayed on the Cape Girardeau railroad on account of the overflowed track. The Iron Mountain and Southern railroad was also under water.

New Hampshire.—Contoocook, Merrimac county, 13th: all machinery in the mills were stopped on account of the high stage of water in the Merrimac river. In some places the banks of the river were overflowed.

New York.—Albany, 16th: the high water in the Hudson on this date submerged the docks, compelling the steamers to deliver freight at points below the city. On the 17th, the river began to fall.

North Carolina.—Lenoir, Caldwell county, 22d: the recent heavy rains have caused damage to the mills, bridges and railroads in this vicinity.

Raleigh, 25th: extensive damage is reported to have been done by the recent heavy rains. Seven land-slides occurred on the North Carolina railroad, and many trestles were washed away.

Province of Ontario.—Niagara Falls, 6th: the heavy rain of the past thirty hours caused a flood at this place which resulted in damage to the extent of several thousand dollars to goods stored in the cellars and basements. Fifty feet of the Canadian southern railroad track were washed away.

Priceville, 16th: the mill-dams and bridges on the Saugeen river were damaged by the high water. Three bridges in the township of Proton were carried away and several others were rendered impassable.

London, 11th: the Thames river has reached the highest point known for ten years. No damage more serious than the washing away of fences, flooding cellars, etc., has been done in this locality.

Saint Catharines, 13th: a serious break has occurred in the mill race of the Hydraulic Race Company. Fifty feet of the break were carried away, and part of the foundation of a factory was undermined.

Province of Quebec.—Saint Hyacinthe, 13th: a dam and bridge on the Yamaska river has been carried away causing a loss of $40,000.

Ottawa, 13th: The water in Ridraw river rose three feet in five minutes, compelling families to leave their homes along the river banks. The track of the Saint Lawrence and Ottawa railroad was submerged, and a bridge valued at $15,000 was washed away.

South Carolina.—Lancaster, Lancaster county, 24th: the new bridge over the Catawba river, except a small part on the Chester side has been swept away.

Reports from Clarendon county state that the heavy rains of the 22d caused much damage to crops and roads in that section.

Tennessee.—Nashville, 7th: over one hundred families were forced to abandon their homes about Nashville on account of the high water in the Cumberland river. On the night of the 21st to 22d, there fell over five inches of rain. The river rose sixteen feet in twenty-four hours, causing serious damage to bridges and railroads. A number of rafts broke from their fastenings, and a large amount of cord-wood and valuable lumber was lost.

Knoxville, 22d: very heavy rain fell during the evening—over three inches in seven hours. On the 23d the river rose twenty feet in a few hours, flooding the basements and cellars of several houses. A land-slide occurred on the Knoxville and Ohio railroad. With this exception no other serious damage resulted in this vicinity.

Vermont.—Richford, Franklin couniy, 12th: a washout occurred on the Southeastern railroad on this date, causing delay of trains.

Bellow's Falls, Windham county, 13th: the water in the Connecticut river washed away about sixty feet of the river bank on this date. The high water is due to the recent heavy rains and the melting of the winter snowfall.

North Troy, Orleans county, 13th: several bridges in this locality have been carried away, and the roads are submerged.

Virginia.—Petersburg, 17th: the creeks are greatly swollen, washing away bridges in the county. The Appomattox river at Farmville rose three feet above its ordinary level. At this place water covered the wharves.

Wisconsin.—Menomonee, Dunn county, 18th: the Menomonee river rose to a point two feet above any previous high-water mark. No serious damage was done in the immediate vicinity of Menomonee, but the high water will cause suspension of operations in the mills for about two weeks. At Cedar Falls, about six miles above Menomonee, the dams and mills were badly injured, and several weeks will be required to repair the damage. At Rice lake, sixty miles above, a large area was flooded and a large amount of damage done. At Downsville, twelve miles below Menomonee, several buildings were washed away. On the Chippewa river the dams along its course were badly washed. Several weeks will be required before travel on the railroads in that locality will be resumed.

HIGH TIDES.

Portsmouth, North Carolina, 17th, 18th.

ICE IN RIVERS AND HARBORS.

Gulf of Saint Lawrence.—Reports from Magdalen Islands on the 4th stated that the Gulf was clear of ice around the islands. Small fields of ice were reported from the southward and westward of North Sydney, Cape Breton Island. On the 12th, the Gulf north of the islands was again covered with ice, which was drifting slowly eastward.

Saint Lawrence river.—Montreal, Province of Quebec, 28th: navigation is now open; several steamers have arrived in port.

Ottawa river.—Ottawa, Province of Ontario, 16th: the ice started in the river on this date.

Lake Ontario.—Rochester, New York, 2d: the first boat of the season arrived on this date. Reports from Madison Barracks, New York, stated that Henderson bay was free from ice on the 20th.

Oswego, New York: the harbor at this place was clear of ice and open to navigation on the 5th. The steamer "D. R. Van Allen," first boat of the season, arrived on this date, and reported having encountered considerable ice on her passage. The harbor was again closed by ice from the 6th to 9th. The steamer "D. R. Van Allen" and the steam-barge "T. Kingston" were the last to leave this port. The schooner "Carolina Marsh," from Port Hope, arrived at Fair Haven on the night of the 9th, where she was detained by ice. She arrived at this port on the morning of the 11th, being the first sailing vessel to arrive this season. There were several arrivals during the day, all reporting large quantities of ice in the lake. On the 14th, the harbor was clear of ice, and vessels experienced no inconvenience in arriving and departing.

Penobscot river.—Bangor, Maine, 13th: navigation open; the steamer "Cambridge" arrived on this date.

Hudson river.—Albany, New York: floating ice from 1st to 10th: river free of ice on the 11th.

Lake Whitney.—New Haven, Connecticut, 5th: lake clear of ice. In 1882, the lake was free of ice by March 3d.

Broad Lake.—Burlington, Vermont: ice broke up in the lake on the 22d; navigation opened 24th.

Lake Erie.—Cleveland, Ohio, 5th: ice started from the shore and passed out, leaving the lake in front of the city free of ice. The steamer "City of Detroit" left on the 7th, for Detroit, Michigan, being the first departure of the season.

Toledo, Ohio, 7th: the tug "Green" left this port for Sandusky, Ohio, on the 5th, and experienced a dangerous passage, being caught in the ice. The bay was reported to be full of ice extending as far as the eye could reach. Navigation between this port, Detroit, Michigan, and Sandusky, Ohio, was fully open on the 9th. Navigation between this port and Cleveland, Ohio, was open by the 14th. The propeller "Gault," from Buffalo, New York, arived on the 26th, at which time navigation on Lake Erie was fully open. The Maumee river was nearly free of ice at this place on the 1st.

Erie, Pennsylvania: Presque Isle bay was clear of ice on the 8th, but the entrance to the bay remained obstructed. Navigation opened on the 25th, the propeller "Wocoken" arriving from Toledo, Ohio, on that date.

Buffalo, New York: the lake at this place was open to navigation on the 23d, but the first arrival and departure occurred on the 25th. Large quantities of ice came into the harbor on the 27th, and on the 29th navigation was interrupted by it. On the 30th, there was still considerable loose ice, but it did not interfere with navigation. The creek became clear of ice on the 7th, having been frozen since December 18, 1882.

Lake Huron.—Port Huron, Michigan: on the 12th, the lake was clear of ice as far as the eye could reach, but ice-fields were visible on the 13th. The first boat of the season, steamer "Idlewild," arrived from Detroit on the 17th, and departed for the upper lakes on the 18th.

Lake Michigan.—Grand Haven, Michigan, 4th: the propeller "Saint Joe," from Chicago, Illinois, and the schooner "O. Shaw," from South Haven, Michigan, were the first boats of the season to arrive at this port.

Grand Traverse bay.—Northport, Michigan: ice moved out of the bay on the 15th.

Thunder bay.—Alpena, Michigan: the tug "Golden Eagle" left this port for Block river on the 16th, being the first departure of the season.

Straits of Mackinaw.—Mackinaw City, Michigan: on the 7th, the ice in the straits, although from twelve to forty inches thick, showed signs of weakening. Stages plying between here and Point Saint Ignace, stopped their regular winter trips on this date. On the 11th, a double team with 1,900 pounds of freight crossed the straits to Point Saint Ignace, the ice being unusually solid for this season of the year. On the 15th, the

ice began to loosen along the shores but remained solid in the channel. The steamer "Algomah" arrived on the 17th and reported the ice to be solid or dammed from McGulpin's Point to the main-land. The steamers "City of Cleveland" and "Flora" arrived at Mackinaw Island on the 21st; on this date the north channel was clear of ice. The propeller "Atlantic," the first boat of the season, passed through the south passage on the 25th. On the 28th the straits were open to navigation.

Little Bay de Noquet.—Escanaba, Michigan: the bay became clear of ice on the 24th and the tug "Shipman" arrived on the 25th. The first passenger steamer of the season arrived from Green Bay on the 26th.

Saint Clair river.—Port Huron, Michigan: floating ice on the 3d and 4th and from the 6th to 9th; ice dam on the 13th, the ice measuring twenty-nine inches in thickness. The ice in Black river broke up on the 8th.

Detroit river.—Detroit, Michigan: drift-ice in river on 1st, 2d, 3d, 5th, 7th, 8th, and from 11th to 17th.

Lake Superior.—Marquette, Michigan, 19th: ice left the harbor during the morning of this date.

Embarras and Wolf rivers.—Embarras, Wisconsin: ice in the Embarras and Wolf rivers broke up on the 11th.

Red River of the North.—Moorhead, Minnesota: the ice broke up on the 9th, and on the 16th, the river was clear of ice. On the 19th, the steamer "Pluck" left for points down the river, being the first boat of the season.

Saint Vincent, Minnesota: the ice broke up on the 19th.

Mississipi river.—La Crosse, Wisconsin, 4th: the ice broke up and formed a dam below the city, which broke during the morning of the 5th. The first steamer ("Minneapolis") of the season arrived from Saint Louis on the 6th.

Saint Paul, Minnesota, 6th: the ice-dam which formed below Wabasba street broke during the afternoon, the ice passing away without damage. The first steamer ("Mary Norton") from Saint Louis arrived on the 20th.

Missouri river.—Fort Stevenson, Dakota: on the 9th, the ice broke along the shores, but remained firm in the channel. During the evening of the 10th, the ice broke up, but became dammed on the afternoon of the 11th. During the 11th and 12th the river rose rapidly, the ice causing considerable damage. The ice-dam broke during the evening of the 12th. The first steamer ("Eclipse") of the season departed on the 18th.

Tobacco Garden, Dakota, 15th: navigation resumed; first departure on this date.

Bismarck, Dakota, 10th: the ice broke at 2.30 p. m. of this date, and passed out without damage.

Fort Bennett, Dakota, 16th: the steamer "Roseburg," the first boat of the season, arrived at this date.

Fort Buford, Dakota: ice broke in the river at this place on the 10th.

Fort Sully, Dakota: the first steamer of the season arrived from the lower Missouri on the 16th.

Miscellaneous.—Pointe de Lac, Province of Quebec, 16th: the ice on Lake Saint Petre is still solid. At Three rivers, Province of Quebec, the ice was firm on the 16th, and at Batiscan, Province of Quebec, the ice broke up on that date.

Saint John's, Newfoundland, 28th: the Mississippi and Dominion Company's steamer "Ontario" passed Cape Race on the evening of the 27th, being the first ocean steamer sighted this season, with the exception of boats calling at Saint John's.

Bangor, Maine: the ice in Kenauskeag springs passed out during the night of the 9th.

Wicklow, Dakota: ice began to break up on the 14th and disappeared from the lake on the 17th.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at the Signal Service stations, with the average depth at which the observations were made, and the mean temperature of the air at the various stations, are given in the table below. Observations were interrupted by ice at the following stations: Mackinaw City, Michigan, from 1st, to 17th, and from 21st to 30th; Milwaukee, Wisconsin, from 1st to 15th; Buffalo, New York, from 1st to 6th; Escanaba, Michigan, from 1st to 18th; Chicago, Illinois, from 1st to 8th; Cleveland, Ohio, from 1st to 8th; Marquette, Michigan, from 1st to 18th; Detroit, Michigan, 1st, 2d, 13th, 14th, 15th; Duluth, Minnesota, from 1st to 7th. At Chicago, the thermometer was broken on the 25th, and no observations were made after that date.

The highest observed temperatures of water during April, 1883, compared with those of April, 1882, show a decrease of from 1° to 9° at stations along the Atlantic coast, between Eastport, Maine, and Jacksonville, Florida, with the exception of the latter station, and Chincoteague, Virginia, where they were 1° higher than in April, 1882. A comparison of the lowest observed water temperatures at stations along the Atlantic coast for the same periods, shows that, with the exception of Sandy Hook, New Jersey, and Portland, Maine, where they are a fraction of a degree higher, the temperatures are from 1° to 12°.5 lower than those of last year.

Temperature of Water for April, 1883.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.	Mean temperature of the air at station.
	Max.	Min.			
	°	°	°	ft. in.	°
Alpena, Michigan*	41.3	30.5	10.8	10 11	35.1
Augusta, Georgia	70.0	58.0	12.0	13 0	64.5
Baltimore, Maryland	54.5	41.5	13.0	9 10	52.1
Block Island, Rhode Island	45.7	36.3	9.4	8 11	42.6
Boston, Massachusetts	46.1	34.2	11.9	20 1	44.3
Buffalo, New York*	50.3	33.4	16.9	9 8	40.2
Cedar Keys, Florida	82.0	68.0	14.0	9 10	72.6
Charleston, South Carolina	68.0	57.9	10.1	40 0	64.0
Chicago, Illinois*	50.9	40.2	10.7	6 11	45.6
Chincoteague, Virginia	60.0	42.0	18.0	5 11	49.1
Cleveland, Ohio*	46.1	33.1	13.0	14 0	44.0
Detroit, Michigan*	47.5	34.0	13.5	23 5	46.2
Delaware Breakwater, Delaware	53.9	39.4	14.5	9 4	47.3
Duluth, Minnesota*	42.3	34.2	8.1	15 4	40.3
Eastport, Maine	36.5	32.6	3.9	16 5	38.0
Escanaba, Michigan*	39.5	34.0	5.5	15 0	36.2
Galveston, Texas	75.0	61.0	14.0	13 8	70.6
Grand Haven, Michigan	56.1	37.1	19.0	19 0	44.4
Indianola, Texas	77.5	64.5	13.0	9 5	71.3
Jacksonville, Florida	77.0	65.0	12.0	18 0	70.1
Key West, Florida	84.3	74.8	9.5	16 9	79.2
Mackinaw City, Michigan*	37.2	33.2	4.0	13 0	35.9
Marquette, Michigan*	38.0	37.0	1.0	9 10	36.9
Milwaukee, Wisconsin*	47.1	42.1	5.0	8 0	43.0
Mobile, Alabama	72.5	63.0	9.5	16 10	68.8
New Haven, Connecticut	50.3	36.1	14.2	14 10	44.2
New London, Connecticut	45.0	38.0	7.0	12 7	43.2
New York City	46.7	37.2	9.5	16 10	46.6
Norfolk, Virginia	61.0	47.0	14.0	17 0	55.8
Pensacola, Florida	75.8	65.9	9.9	18 3	68.9
Portland, Maine	40.7	34.5	6.2	18 5	44.7
Portland, Oregon	51.0	45.2	5.8	48 7	49.2
Provincetown, Massachusetts	46.5	34.5	12.0	14 0	41.8
Punta Rassa, Florida	85.0	76.6	8.4	11 4	75.1
Sandy Hook, New Jersey	46.5	42.8	3.7	1 6	46.6
San Francisco, California	56.5	52.4	4.1	29 1	52.4
Savannah, Georgia	68.4	57.0	11.4	12 11	67.7
Smithville, North Carolina	63.0	58.0	5.0	10 0	59.2
Toledo, Ohio	58.3	37.8	20.5	11 3	47.4
Wilmington, North Carolina	65.5	49.0	16.5	13 0	61.3

*Observations incomplete. See text.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The auroral display which occurred during the evening of April 3d, was generally observed in Canada, New England, the lower lake region, and at a few of the most northerly stations in the middle Atlantic states. At most of the stations where this display was observed, it was of ordinary brilliancy. At Eastport, Maine, it was visible from 7 p. m. until the early morning of the 4th, and consisted of a low arch extending from north-northwest to northeast. Several streamers of whitish color tinged with crimson appeared between the north and northeast.

At Freehold, New Jersey, this display was observed at 7.30 p. m., in the form of a white glow, with several long narrow streamers. It faded away at 8.30 and reappeared at 10 p. m. The only western stations reporting auroras on the evening of the 3d were Saint Vincent, Minnesota, and Dayton, Washington Territory. At the latter station, it was described as

resembling the morning twilight, and was observed between 10.30 p. m. of the 3d and 2 a. m. of the 4th. It was visible only in the northeast, the remainder of the sky being obscured by clouds. At Saint Vincent, Minnesota, auroral beams were visible from 9.30 a. m. until the morning of the 4th.

The most brilliant and widely observed display of the month was that which occurred during the evening of the 24th. Owing to the cloudiness which prevailed in the New England states it was reported by but few stations in that section. At Escanaba, Michigan, it first appeared at 9.30 p. m., as an arch of pale yellow light changing rapidly to a bright yellowish green with beams extending toward the zenith. This display was especially noted for the southerly latitudes in which it was observed. It was seen at Nashville, Tennessee, at 7.50 p. m., as an arc of whitish light tinged with light blue which extending over 40° of the northern horizon and to an altitude of 9°. Several beams were observed between 8.15 and 8.25 p. m.

At Chapel Hill, North Carolina, it was observed as a faint display from 8 to 9 p. m.

At Variety Mills, Virginia, the aurora was brilliant from 8.20 to 9 p. m., extending from north-northeast to north-northwest, with streamers reaching an altitude of from 18° to 20°. This display was also seen at Washington, District of Columbia, from 7.45 to 9 p. m. The most westerly stations reporting this aurora were Forts Assinniboine and Benton, Montana. At Fort Assinniboine, it was visible from 9.30 to 11 p. m., with bright streamers reaching an altitude of 45°. At Fort Benton, it was reported as a faint display from 8 to 11 p. m.

Displays of less extent and brilliancy were reported as follows:

1st.—At Kiantone, New York, and Bristol, New Hampshire.

2d.—Newport, Vermont.

4th.—Saint Vincent, Minnesota; Wicklow, Dakota, and at numerous stations in New England and Canada.

5th.—Escanaba, Michigan; Saint Vincent, Minnesota; Manitowoc, Wisconsin.

6th.—Duluth, Minnesota; Murfreesborough, Tennessee. On this date the s. s. "Circassian," in N. 51° 30′, W. 30° 00′, saw northern lights showing brightly.

7th.—Franklin, Wisconsin; Escanaba, Michigan; Charlottetown, Prince Edward Island.

9th.—Kiantone, New York.

10th.—Sidney, Nova Scotia; Fredericton, New Brunswick.

15th.—Rochester, New York.

17th.—Fredericton, New Brunswick.

18th.—Bordentown, New Jersey; Eastport, Maine; Fort Benton, Montana.

19th.—Escanaba and East Tawas, Michigan; Cresco, Iowa.

25th.—Fredericton, New Brunswick; Gardiner and Dexter, Maine; Woodstock, Vermont; Franklin, Pennsylvania; Alpena and Escanaba, Michigan; Fort Assinniboine Montana.

26th.—Fredericton, New Brunswick; Dexter, Maine; Franklin, Wisconsin; Bismarck, Dakota; Saint Vincent, Minnesota.

27th.—Wicklow, Dakota; Toronto, Ontario; Woodstock, Vermont.

28th.—Kiantone, New York.

29th.—Catawissa, Pennsylvania; Ionia, Michigan.

30th.—Charlottetown, Prince Edward Island; Franklin, Wisconsin.

ELECTRICAL PHENOMENA.

Pike's Peak, Colorado, 18th.—All metallic objects were tipped with electric light during the morning.

Yuma, Arizona, 12th and 20th.—The observer experienced severe shocks from contact with the anemometer wires to which no battery was attached.

THUNDER-STORMS.

Thunder-storms were reported in the various districts on the following dates:

New England.—12th, 20th.

Middle Atlantic states.—5th, 6th, 7th, 11th, 12th, 17th to 20th, 22d, 23d, 27th, 28th.

South Atlantic states.—1st, 2d, 5th, 6th, 7th, 9th, 11th, 12th, 15th, 16th, 19th, 22d, 23d, 24th, 26th, 28th, 29th, 30th.

Florida peninsula.—1st, 2d, 10th to 13th, 23d, 24th, 28th, 29th, 30th.

Eastern Gulf.—1st, 3d, 4th, 6th, 7th, 9th, 11th, 12th, 14th, 15th, 19th, 22d, 23d, 27th to 30th.

Western Gulf.—3d to 8th, 10th, 11th, 13th, 14th, 15th, 18th, 19th, 21st, 22d, 23d, 26th to 30th.

Rio Grande valley.—5th, 6th, 26th, 28th, 29th.

Ohio valley and Tennessee.—4th to 7th, 9th to 15th, 19th, 21st, 22d, 23d, 26th, 27th, 28th, 30th.

Lower lakes.—5th, 10th, 11th, 13th, 15th, 16th, 19th, 27th, 28th.

Upper lakes.—4th, 5th, 7th, 10th, 11th, 13th, 14th, 15th, 18th, 22d, 27th.

Extreme northwest.—9th, 10th, 11th, 17th, 20th.

Upper Mississippi valley.—3d to 7th, 9th to 15th, 19th, 21st, 22d, 23d, 27th, 28th.

Missouri valley.—3d, 4th, 5th, 9th to 14th, 18th, 20th, 21st, 22d, 26th, 27th, 29th, 30th.

Northern slope.—7th, 10th, 13th, 20th, 27th to 30th.

Middle slope.—3d, 4th, 5th, 9th, 11th to 14th, 20th, 21st, 22d, 25th, 26th, 27th, 29th, 30th.

Southern slope.—3d, 5th, 7th, 9th, 12th, 21st, 26th, 29th.

Southern plateau.—6th, 26th, 28th, 29th.

Northern plateau.—7th, 19th, 27th, 29th.

Thunder-storms were also reported from the following state and territory not included in the districts named above:—

California.—Fort Bidwell, 26th; San Diego, 3d.

Utah.—Salt Lake City, 4th.

The following instances of damage by lightning during thunder-storms have been reported:

Indianapolis, Indiana, 6th.—The building of the telephone exchange in this city was struck by lightning at 8 a. m. The tower where the wires centered was completely destroyed, entailing a loss of $2,500.

New London, Connecticut, 12th.—During the thunder-storm of this date, several buildings were damaged by lightning.

Dedham, Massachusetts, 20th.—A church at this place was struck by lightning and damaged to the extent of $2,400.

Catawissa, Pennsylvania, 20th.—A large paper-mill was struck by lightning and burned. Over one hundred cords of wood were destroyed. The loss in this vicinity is estimated at more than $125,000.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos have been observed in the various districts on the following dates:

New England.—1st, 2d, 10th, 12th, 14th, 17th, 19th, 21st, 26th, 29th.

Middle Atlantic states.—2d, 3d, 5th, 6th, 7th, 9th, 13th, 18th, 19th, 22d, 26th, 27th, 30th.

South Atlantic states.—3d, 4th, 6th, 7th, 9th, 12th to 15th, 19th, 22d, 24th.

Western Gulf.—3d, 5th, 12th, 17th, 18th, 22d, 23d, 25th, 29th.

Ohio Valley and Tennessee.—3d, 4th, 6th, 8th to 14th, 17th, 18th, 19th, 21st, 22d, 24th, 26th, 27th, 28th.

Lower lakes.—1st, 2d, 3d, 13th, 17th, 18th, 21st, 23d, 25th, 26th.

Upper lakes.—1st, 7th, 8th, 11th, 12th, 13th, 17th, 18th, 20th, 23d to 26th.

Extreme northwest.—3d, 10th, 19th, 20th, 24th.

Upper Mississippi valley.—1st, 2d, 4th, 6th, 9th, 11th, 12th, 13th, 17th to 26th, 28th, 29th, 30th.

Missouri valley.—3d, 6th, 16th to 19th, 24th, 29th.

Middle Pacific.—2d, 3d, 7th, 9th, 10th, 11th, 13th to 16th, 18th, 20th, 27th, 28th 29th.

South Pacific.—1st, 2d, 6th, 7th, 15th to 18th, 22d, 27th, 28th.

Solar halos were also observed in following states and territories not included in the districts named above:

Arizona.—Prescott, 10th, 16th, 17th, 28th.
Colorado.—Colorado Springs, 23d.
Florida.—Key West, 25th; Pensacola, 26th, 29th.
Idaho.—Lewiston, 4th, 5th, 6th, 14th.
Kansas.—Yates Centre, 1st, 10th, 11th, 12th, 17th, 26th.
Mississippi.—Vicksburg, 2d, 3d, 17th, 18th, 26th, 30th.
Montana.—Fort Keogh, 19th; Terry's Landing, 19th, 20th.
Nevada.—Carson City, 25th.
Oregon.—Albany, 6th, 17th, 27th; Roseburg, 17th, 28th.
Texas.—Fort Davis, 16th; Rio Grande City, 19th.
Utah.—Salt Lake City, 16th, 18th, 28th.

Mr. B. B. Cutler, of Heath, Massachusetts, reports having observed a solar halo of very unusual character at that place on April 26th.

LUNAR HALOS.

Lunar halos have been observed in the various districts on the following dates:

New England—13th, 14th, 17th to 20th, 26th.
Middle Atlantic states.—11th, 13th, 15th, 17th, 18th, 19th, 21st.
South Atlantic states.—6th, 11th, 14th, 15th, 18th, 19th, 21st, 23d.
Eastern Gulf.—12th, 14th, 17th, 18th.
Western Gulf.—13th, 14th, 16th, 17th, 22d, 23d, 24th.
Rio Grande valley.—14th, 15th, 16th.
Ohio valley and Tennessee.—12th, 14th, 17th to 20th.
Lower lakes.—11th to 15th, 18th to 21st, 25th, 26th.
Upper lakes.—2d, 10th, 11th, 12th, 14th, 16th to 20th, 22d, 23d, 24th.
Extreme northwest.—11th, 12th, 15th, 18th, 19th, 20th.
Upper Mississippi valley.—11th, 12th, 17th to 20th, 23d, 24th, 25th, 30th.
Missouri valley.—10th to 14th, 16th to 20th.
Northern slope.—12th, 13th, 16th to 19th, 22d.
Middle slope.—4th, 10th, 16th, 17th, 18th, 20th, 22d, 23d, 27th.
Southern plateau.—15th, 17th, 18th.
Northern plateau.—18th, 19th, 23d.
Middle Pacific.—10th 13th to 16th, 18th, 28th.
South Pacific.—8th, 14th, 15th, 17th, 23d.

Lunar halos were also observed in the following states and territories not included in the districts named above:

Florida.—Limona, 21st.
Nevada.—Carson City, 18th.
Oregon.—Albany, 20th; Portland, 18th.
Texas.—Fort Concho, 16th.
Utah.—Salt Lake City, 15th, 16th.

Mr. John H. Gibson, of Salina, Kansas, has forwarded an illustration of a very complete lunar halo, as observed by him at 7.30 p. m. of April 10th. He reports in connection with it: moon, three days old; temperature, 42°; barometer, (aneroid,) 28.50; wind, nw. and velocity two miles. The illustration shows the halo to have been of the class represented in Figure 85, page 216 of "Loomis' Treatise on Meteorology."

MIRAGE.

Wicklow, Dakota, 3d.—The village of Madison was plainly visible, which is ten miles distant and is hidden from view by the swell in the prairie. On the 9th, the country in the southwest beyond the horizon was plainly visible. Mirage similar to that observed on the 3d, was also seen on the 16th.

Duluth, Minnesota, 20th.—At 5.00 p. m., a fine mirage was observed, about eighteen miles distant on the southern shore of the lake. Three well-defined lakes, surrounded by and filled with islands, were distinctly seen through the telescope.

Mirage was also observed at the following stations:

Alexandria, Dakota, 6th, 7th, 19th, 26th.
West Bend, Iowa, 16th.
Northport, Michigan, 12th.
Traverse City, Michigan, 20th.
Pretty Prairie, Kan, 2d, 6th.
Indianola, Texas, 1st, 23d.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and seventy-three stations show 5,156 observations to have been made, of which twelve were reported doubtful; of the remainder, 5,144, there were 4,331, or 84.2 per cent., followed by the expected weather.

SUN SPOTS.

The following record of sun spots for the month of April, 1883, has been forwarded by Mr. D. P. Todd, Director of the Lawrence Observatory, Amherst, Massachusetts:—

DATE—April, 1883.	No. of new		Disappear'd by solar rotation.		Reappear'd by solar rotation.		Total No. visible.		REMARKS.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 8a. m...	2	5	1	5	0	0	4	20‡	One of spots very large.
3, 8a. m...	1	5	0	0	0	0	5	25‡	Do.
4, 9a. m...	1	3	0	0	0	0	6	30‡	Do.
5, 8a. m...	1	5	0	0	0	0	7	35‡	Do.
7, 5p. m...	1	5	2	5	0	0	5	30‡	
8, 9a. m...	0	0	0	0	0	0	5	30‡	
8, 2p. m...	0	0	0	0	0	0	5	30‡	
10, 6p. m...	0	0	1	5	0	0	4	20‡	
12, 10a. m...	2	15‡	1	2	2	15‡	4	35‡	
13, 11a. m...	1	5	0	0	1	5	5	40‡	
14, 12 m...	0	20‡	1	2	0	5	4	60‡	Many spots quite small.
15, 11a. m...	1	5	0	0	0	0	5	65‡	Do.
15, 3p. m...	1	5	0	0	0	0	6	70‡	Do.
18, 8a. m...	0	0	1	2	0	0	5	65‡	Do.
19, 8a. m...	0	5	0	5	0	0	5	65‡	Do.
19, 11a. m...	0	0	0	0	0	0	5	65‡	Do.
20, 5p. m..	0	0	1	10‡	0	0	4	55‡	Do.
21, 10a. m...	1	2	0	0	1	2	5	55‡	Do.
25, 12 m....	3	15‡	.....	.....	.....	.....	5	20‡	
26, 3p. m...	0	0	0	0	0	0	5	20‡	
27, 3p. m...	1	1	0	0	1	1	6	15‡	
28, 8a. m ..	0	0	0	0	0	0	6	12	
29, 5p. m...	0	0	2	3	0	0	4	10	
30, 11a. m...	0	0	0	0	0	0	3	8	

‡Approximated. Faculæ were seen at the time of every observation.

Mr. H. D. Gowey, at North Lewisburg, Ohio, reports that sun spots were observed on all clear days during the month. They were most numerous on the 16th; least numerous on the 26th; largest on the 3d, and smallest on the 24th.

Lieutenant W. H. Smith, R. N. R., commanding the s. s "Circassian," reports having observed sun spots between N. 42° 10′, W. 52° 15′, and N. 55° 02′, W. 5° 41′, from April 2d to 9th, as follows: 2d, one spot; 3d, one spot; 8th, two spots; 9th, two spots.

METEORS.

Visalia, California, 1st, 10th, 21st, 25th.
Wicklow, Dakota, 2d, 26th.
West Washington, District of Columbia, 8th.
Bethel, Connecticut, 10th.
Morrison, Illinois, 28th.
Davenport, Iowa, 8th, 23d.
Indianola, Iowa, 18th.
Clay Centre, Kansas, 9th.
Yates Centre, Kansas, 13th.
Woodstock, Maryland, 5th, 8th, 10th, 14th.
Boston, Massachusetts, 1st.
Cambridge, Massachusetts, 4th.
Charlestown, Massachusetts, 4th, 7th.
Rowe, Massachusetts, 3d, 8th.
Lansing, Michigan, 3d.
Swartz Creek, Michigan, 80th.
Brevard, North Carolina, 8th.
Stateburg, South Carolina, 18th, 19th.

The schooner "Jennie N. Huddell," at Hampton Roads, Virginia, observed a brilliant meteor at midnight of the 4th.

EARTHQUAKES.

San Francisco, California, 2d.—Two light shocks of earth-

quake were felt here at 8.50 a. m. of this date. The vibrations were from north to south.

The following report was published in the "New York Herald" of April 4, 1883:

"Catania, Sicily, April 3d.—A severe shock of earthquake has occurred at Riposto, and the oscillations still continue. Two light shocks have also been felt in this locality."

Cairo, Illinois, 12th.—A heavy shock of earthquake was felt at 2.36 a. m., lasting about thirty seconds. The vibrations were from south-southwest to north-northeast, and occurred at about the rate of three per second. An old frame house was shaken down, the inmates receiving slight injuries.

The following account of an earthquake in Finland is taken from "Nature," May 3, 1883:

On April 8, at 9 p. m., an earthquake was observed in Finland, where this phenomenon is extremely rare. At Nykarleby the shocks were rather severe, and were accompanied by a subterranean rattling and rumbling noise; their direction was from southwest to northeast. At Wasa the ground oscillated to an alarming extent. At Ytterjeppo, even the houses were shaken to their foundations and their downfall was feared; the same intensity in the shocks was observed on the "domaine" of Back.

SAND-STORMS.

Los Angeles, California, 12th.—A severe sand-storm occurred during the afternoon, during which the wind reached a velocity of forty-two miles per hour, and caused considerable damage.

Fresno, California, 20th.—The severest sand-storm that has visited this place for many years occurred about 1 p. m. of this date.

Sand-storms of less severity have been reported as follows:
Apache Pass, Arizona, 12th.
Fort Bowie, Arizona, 13th, 20th, 21st.
Fort Thomas, Arizona, 12th, 13th, 20th, 21st, 22d, 24th.
Tucson, Arizona, 10th, 13th, 14th, 15th, 19th, 21st.
Yuma, Arizona, 3d, 8th, 12th, 30th.
Los Angeles, California, 13th, 20th.
Visalia, California, 19th.
Fort Garland, Colorado, 4th, 9th, 12th, 13th, 20th.
West Las Animas, Colorado, 9th, 20th.
Crete, Nebraska, 8th, 10th, 13th, 20th, 21st.
Fort Cummings, New Mexico, 13th, 20th.
Fort Union, New Mexico, 9th to 13th, 15th, 16th.
Santa Fé, New Mexico, 4th, 12th, 20th.
El Paso, Texas, 13th, 20th, 21st, 22d.

POLAR BANDS.

Texas Hill, Arkansas, 2d, 19th, 20th, 25th.
Cape Mendocino, California, 13th, 16th, 17th, 24th, 26th, 28th.
Alexandria, Dakota, 24th.
Wicklow, Dakota, 19th, 23d, 24th.
Riley, Illinois, 20th, 24th.
Pretty Prairie, Kansas, 15th.
Yates Centre, Kansas, 1st, 16th, 20th, 21st, 29th.
Shreveport, Louisiana, 27th.
Heath, Massachusetts, 3d.
Clear Creek, Nebraska, 17.
Freehold, New Jersey, 21st.
Vineland, New Jersey, 17th, 30th.
Block Island, Rhode Island, 2d.
Charleston, South Carolina, 1st.
Nashville, Tennessee, 3d, 4th, 6th, 26th, 27th.
Wytheville, Virginia, 17th.

ZODIACAL LIGHT.

Prescott, Arizona, 1st, 2d, 6fh, 8th, 23d to 30th.
Mount Forest, Canada, 16th, 20th.
Wicklow, Dakota, observed, 2d, 3d, 4th, 5th; suspected, 7th.
Pensacola, Florida, 25th.
Wabash, Indiana, 29th.
Cresco, Iowa, 1st.
Salina, Kansa, 8th, 30th.
Elk Falls, Kansas, 13th.
Cambridge, Massachusetts, visible, 1st, 2d, 4th, 6th, 8th, 25th, 29th, 30th; suspected, 10th.
Dudley, Massachusetts, 20th, 24th.
Rowe, Massachusetts, 3d, 8th.
Somerset, Massachusetts, 2d, 6th, 8th.
Clear Creek, Nebraska, 7th.
Wauseon, Ohio, 1st, 2d, 7th, 8th, 9th, 17th, 25th, 28th, 29th.
Nashville, Tennessee, 3d, 7th, 24th to 30th.
Palestine, Texas, 10th, 19th, 22d, 23d, 25th.
Variety Mills, Virginia, 3d, 4th, 5th, 25th.
Wytheville, Virginia, 3d, 4th, 7th.

PRAIRIE AND FOREST FIRES.

Wahoo, Saunders county, Nebraska, 8th.—A serious fire broke out in the Richland precinct on this date, destroying considerable property.

Pike's Peak, Colorado, fire in southeast on 2d.
West Las Animas, Colorado, 9th.
Fort Stevenson, Dakota, 23d, 27th, 30th.
Fort Yates, Dakota, 5th, 7th, 8th, 9th, 10th, 16th.
Huron, Dakota, 5th, 6th, 8th, 16th, 19th.
Yankton, Dakota, 6th, 7th, 9th, 20th, 24th, 26th, 27th.
Alexandria, Dakota, 8th, 12th, 17th, 18th, 20th, 24th, 25th, 27th, 29th, 30th.
Fort Supply, Indian Territory, 10th, 13th.
Humboldt, Iowa, 3d, 9th.
Independence, Kansas, 1st to 30th.
Saint Vincent, Minnesota, 21st, 22d, 23d.
Fort Custer, Montana, 16th.
Fort Assinniboine, Montana, 27th, 28th.
De Sota, Nebraska, 3d, 8th, 9th.
Genoa, Nebraska, 8th, 13th, 19th.
North Platte, Nebraska, 7th, 19th.
Omaha, Nebraska, 8th, 9th, 26th.
Santa Fé, New Mexico, 2d.
Coleman City, Texas, 9th.

DROUGHT.

Thornville, Michigan, 30th.—The cold and dry weather of April has been very unfavorable to the wheat crop in this section.

Archie, Missouri, 30th.—The wheat crop in this vicinity is suffering from drought.

MIGRATION OF BIRDS.

Geese flying northward.—Fort Hale, Dakota, 3d; Alexandria, Dakota, 3d, 26th, 27th; Guttenburg, Iowa, 1st, 2d, 6th, 8th; Monticello, Iowa, 4th; Indianola, Iowa, 2d; Independence, Kansas, 1st, 11th; Clay Centre, Kansas, 1st, 16th; Fort Scott, Kansas, 2d; Pretty Prairie, Kansas, 6th; Yates Centre, Kansas, 9th; Somerset, Massachusetts, 9th; Clear Creek, Nebraska, 20th; North Platte, Nebraska, 7th; Palermo, New York, 4th; Albany, Oregon, 21st, 26th, 27th; Wellsboro', Pennsylvania, 4th; Randolph, Vermont, 4th; Embarras, Wisconsin, 24th, 27th, 28th; Franklin, Wisconsin, 30th; Bangor, Maine, 8th; Point Judith, Rhode Island, 4th, 5th, 6th, 9th, 21st; Narragansett Pier, Rhode Island, 5th, 11th, 12th; New Haven, Connecticut, 5th; Eastport, Maine, 8th, 22d; Kittyhawk, North Carolina, 6th; Oswego, New York, 10th; Rochester, New York, 8th; Escanaba, Michigan, 28th; Fort Stevenson, Dakota, 7th; Huron, Dakota, 3d, 17th, 26th; Omaha, Nebraska, 1st; Fort Custer, Montana, 8th; Fort Reno, Indian Territory, 6th; Cape Mendocino, California, 12th; Red Bluff, California, 24th, 25th, 26th. *Flying southward.*—Fort Lapwai, Idaho, 15th; Wicklow, Dakota, 1st to 7th, 16th. *Flying westward.*—Clay Centre, Kansas, 17th.

Ducks flying northward.—Alexandria, Dakota, 3d, 4th; Huron, Dakota, 3d; Saint Vincent, Minnesota, 2d, 8th; Dubuque, Iowa, 6th, 7th, 8th, 9th; Monticello, Iowa, 4th; Mackinaw City, Michigan, 17th; Manitowoc, Wisconsin, 5th; Chambersburg, Pennsylvania, 7th, 26th. *Flying southward.*—Wicklow, Dakota, 3d to 7th.

Brants flying northward.—Indianola, Iowa, 7th; Pretty Prairie, Kansas, 6th. *Flying southward.*—Wicklow, Dakota, 8th, 15th, 16th; Indianola, Iowa, 9th.

Cranes flying northward.—Pretty Prairie, Kansas, 6th; Indianola, Iowa, 2d, 8th; Guttenburg, Iowa, 8th; Palermo, New York, first appearance, 7th. *Flying southward.*—Wicklow, Dakota, 18th, 20th.

NOTES AND EXTRACTS.

The following extract is taken from the report of the Illinois Meteorological Service:

SEASON.

April was a cold and, in many portions of the state, a dry month.

Vegetation made but little growth during the past month, and is three weeks behind average seasons.

The cool weather has been favorable for work-animals, and the labor of seeding is well advanced.

TEMPERATURE.

The mean temperature of April for six years in the several divisions of the state is as follows:

Division.	1878.	1879.	1880.	1881.	1882.	1883.
	°	°	°	°	°	°
Northern	53.00	46.00	49.00	40.80	48.55	48.13
Central	58.00	51.00	52.00	45.20	53.44	53.18
Southern	60.00	55.00	57.00	53.30	58.55	57.40
Average	57.00	51.00	53.00	46.43	53.51	52.90

It will be seen from the foregoing table that the mean temperature of the past month is lower than that for April, 1882.

With the exception of April, 1879, and 1881, the past month was the coldest April since 1877 in the northern division of the state.

The mean temperature from January 1st to April 30th, 1883, was lower than for corresponding months in the preceding five years in this division.

The mean temperature in 1878, 1880, and 1882, to April 30th, was about 10° warmer than for the corresponding period of the present year in the northern portion of the state.

In April, 1883, the mean temperature in the central counties was lower than in Aprils 1878 and 1882, and higher than for the same month in 1879, 1880, and 1881.

The mean temperature for the first four months in 1883, with the exception of the same period in 1881, is lower in the central portion of the state than for the corresponding period in any year since 1877.

The mean temperature for April, 1883, in the southern division of the state was lower than in April, 1878 and 1882, and higher than for the same month in 1879, 1880, and 1881.

From January 1st to April 30th, 1883, the mean temperature in the southern counties was lower than for any like period since 1877, with the exception of 1881.

RAINFALL.

The average monthly rainfall, including melted snow, for the past six Aprils, is as follows:

Division.	1878.	1879.	1880.	1881.	1882.	1883.
	°	°	°	°	°	°
Northern	3.72	2.13	4.29	1.81	4.55	3.26
Central	3.63	1.99	4.29	1.89	4.14	4.66
Southern	5.20	2.41	3.22	4.11	2.84	4.59
Average	4.18	2.18	3.93	2.60	3.84	4.17

The mean precipitation for the state in April, 1883, of 4.17 inches, exceeds that of the same month in any year since 1878.

The precipitation in the northern counties for April, 1883, of 3.26 inches, is less than the rainfall of corresponding month in 1878, 1880, and 1882.

The average monthly precipitation in these (the northern) counties for the first four months of 1883, of 2.57 inches, is less than that of the corresponding period since 1879.

The rainfall in April, 1883, of 4.66 inches in the central counties largely exceeds that of the same month since 1877.

The average monthly rainfall in the central division from January 1st to April 30th, 1883, was 3.45 inches—the lowest average for a like period for the past six years, with the exception of the corresponding months of 1881 and 1882.

The rainfall in the southern portion of the state in April, 1883, of 4.59 inches, largely exceeds that of any corresponding month since 1878.

The average monthly rainfall of 4.43 inches for the first four months of 1883, is more than for a like period since 1877, with the exception of 1882.

Dr. Gustavus Hinrichs, Director of the Iowa Weather Service, has forwarded an advance proof of his interesting report for the month of April, 1881, which is as follows:

IOWA WEATHER BULLETIN, FOR APRIL, 1883.

April, 1883, was rather warm, but otherwise nearly normal.

The mean temperature of the air was not quite two degrees above normal; the middle decade being seven degrees above, and the last decade being two and a half degrees below normal.

The amount of precipitation was nearly normal, diminishing from over three inches in the southeast and the lower Des Moines valley, to but little over one inch in the northeast and the northwest. The principal days with precipitation were the 4th and 5th, the 13th and 14th, and the 22d. But very little snow fell. The month was more windy than usual, the total run of the wind exceeding the normal value nearly twenty per cent Our state was almost free from whirlwinds during April; only a very limited tornado ran up the Maple river valley on the evening of the 22d, the date of the exceedingly destructive whirlwind of Beauregard and Wesson in Mississippi.

During the severe thunder-storms of the 4th, 13th, and 22d hail has fallen and lightning has done damage to buildings, stacks, and stock.

Halos were seen, especially from the 17th to the 19th, preceding the cold weather of the last decade. The zodiacal light was observed but a few times. The northern light was very generally observed on the 24th throughout the eastern half of Iowa, and was also seen on the 19th.

On the whole, the weather during April has been remarkably favorable for all farm and garden work, and our spring is making promise of a fruitful year. May is probably going to be normal or somewhat below, and the summer promises to be a warm one; if these indications shall be realized, the harvest will be abundant.

GUSTAVUS HINRICHS.

CENTRAL STATION, I. W. S., May 7, 1883.

The damage to orchards is largely limited to the more treeless region of central Iowa; in many parts of the state the fruit-buds are quite healthy.

To prevent damage from late frosts, the twigs cut off in pruning should be heaped mainly at the corners of the orchard, and be set to burn so as to envelope the orchard in smoke on the approach of a cold night; so far as the smoke covers the bloom, no damage from frost will be sustained.

Severe night frosts may occur as as the 25th of May. They are especially to be looked for between the 10th and 15th, that is about the 12th. They are again to be feared about the 22d. If the 25th has been safely passed, the fruit bloom has escaped the most sweeping destruction to which it is liable.

Mr. W. Earle Cass, Director of the New Jersey Weather Service, has forwarded the following meteorogical summary for the month of April 1883:

Stations.	Temperature.			Rainfall.
	Max.	Min.	Mean.	
	°	°	°	
Rockland Lake, New York				3.01
Cape May Point, New Jersey	62.5	29.0	48.1	4.69
Somerville, New Jersey	69.9	30.0	46.8	3.07
Atlantic City, New Jersey	63.0	27.0	45.5	4.31
Sandy Hook, New Jersey	68.0	27.0	46.6	5.79
Newton, New Jersey	70.2	19.8	47.6	3.93
New York City, New York	70.0	26.5	46.6	3.82
Port Jervis, New York	65.0	23.0	44.2	3.87
New Brunswick, New Jersey	68.0	24.5		4.53
Lambertville, New Jersey				2.81
Newark, New Jersey	71.0	23.5	47.6	4.64
Barnegat City, New Jersey	61.3	32.0	46.0	3.93
Fallsington, Pennsylvania	72.0	32.0	48.3	3.88
Belvidere, New Jersey				2.79
Princeton, New Jersey	67.8	22.3	46.2	2.46
Philadelphia, Pennsylvania	72.0	27.0	50.0	2.44
Vineland, New Jersey	80.0	26.0	49.2	3.96
Caldwell, New Jersey				5.38
Freehold, New Jersey	70.0	24.0	44.9	3.90
Atlantic City, New Jersey	61.0	11.0	35.0	3.09

The Missouri Weather Service, under direction of Professor Francis E. Nipher, has issued the following report for April, 1883:

MISSOURI WEATHER SERVICE; APRIL, 1883.

The average temperature of April has been 56°.7 at Saint Louis, which is about half a degree above the normal of Englemann's series. Since 1837 the mean April temperature has once reached 66°.8—in 1844—and in 1857 it fell to 44°.1, a range of 22°.7. The extremes during the last month have been 32°.2, on the 24th, and 85°.6, on the 14th, which are very ordinary temperatures. In April, 1857, the lowest daily minimum was 18°.0; while in the years 1838, 1843, and 1855 the highest maximum reached was 93°.0.

In the state, the maximum temperature has been the highest in the central part, Glasgow reporting 93°.0, Miami 92°.0; while at Cairo, Illinois, the highest temperature reached was 84°.5, that at Keokuk being 85°.0. The lowest minimum reported was 22°.0 at Centreville, and twelve stations out of twenty-one reported the minimum as 32°.0, or below.

The rainfall at the central station has been 2.62 inches, the normal rainfall being 3.70 inches. At the Saint Louis water-works, however, the rainfall has been 3.87 inches.

The rainfall has been heaviest, or more than 5.00 inches, in the extreme southeastern part of the state. In the central western part, and in a narrow belt extending therefrom to Macon and Shelbina, the fall has been less than 1.00 inch, while in the north the fall has been over 2.00 inches.

At 4.00 p. m., on the 14th, a severe local storm, which was apparently an incipient tornado, did considerable damage at Hannibal. Its track was about three hundred feet wide. Similar storms with hail were observed seven miles west and ten miles north of Mexico. A small tornado having

a width of fifty to seventy feet passed through the western part of Pleasant Hill between 7.30 and 8 a. m. A portion of a rail-fence was carried eight feet and set down without materially changing the relative positions of the rails.

In the dry area of the past month, where ice-crust did damage to the wheat during the winter, additional damage has been done by the drought and high winds of the past month. At Savannah not over one-tenth of a crop is left, and farmers are planting the ground in corn. Meadow is also light. In the southeastern part, however, the plentiful rains have repaired to some extent the damage done to wheat, and it is turning out better than was expected.

Thus far the fruit crop has not been materially injured by frost, the cool and uniform temperature having been very favorable.

FRANCIS E. NIPHER, *Director*

WASHINGTON UNIVERSITY, *May* 5, 1883.

The Ohio Meteorological Bureau, Professor T. C. Mendenhall, Director, has, through the co-operation of the Cleveland, Akron and Columbus Railroad Company, introduced a system of railway weather signals, by which the weather conditions, as predicted by the United States Signal Service, are shown from the sides of the baggage cars of the mail trains. This system of weather forecasts was successfully operated during April, over eighty-five per cent. of the predictions being verified. The following is an explanation of the signals used:

The signal will consist of two figures which differ in color, being red or blue, and in form, being shaped like the sun, the moon, or a star.

The red color has to do with the temperature, and the blue with the state of the weather, as rainfall or snow; they are used as below:

Red.—Sun, higher temperature; moon, lower temperature; star, stationary temperature.

Blue.—Sun, general rain or snow; moon, clear or fair weather; star, local rain or snow.

By "higher" or "lower" temperature is meant that the temperature at any hour of the day may be expected to be higher or lower than it was at the same hour the previous day; and by "stationary" temperature, that it will not vary more than three or four degrees from the record of the day before.

"Local" rains are such that are likely to occur at one or more points along the line, but will not probably be "general." Local rains are not generally of long duration.

Professor Mendenhall furnishes the following meteorological summary for April, 1883:

Report of the Ohio meteorological bureau. *Summary for the month of April, 1883.*

Numbers.	Stations	Counties.	Mean barometer.	Highest barometer.	Day of month.	Lowest barometer.	Day of month.	Range of barometer.	Mean relative humidity.	Mean temperature.	Highest temperature.	Day of month.	Lowest temperature.	Day of month.	Range of temperature.	Mean daily range of temperature.	Greatest daily range of temperature.	Day of month.	Least daily range of temperature	Day of month.	Number of clear days.	Number of fair days.	Number of cloudy days.	Days on which rain or snow fell.	Total rainfall for month.	Average daily rainfall.	Direction of wind.
										°	°		°		°	°	°		°							
1	Cincinnati	Hamilton	29.996	30.368	3	29.516	23	.852	66.6	55.1	83.0	14	32.0	1	51.0	17.2	29.0	4	6.0	2	8	12	10	15	3.72	.124	ne.
3	Dayton	Montgomery.	30.017	30.382	3	29.670	23	.712	72.4	50.4	83.2	14	25.2	2	58.0	20.1	30.8	17	7.5	1	9	11	10	11	2.28	.076	ne.
4A	Lima	Allen	30.058	30.348	3	29.783	10	.565	82.7	48.4	84.0	14	19.0	2	65.0	27.3	42.0	29	12.8	23	13	11	6	7	2.81	.094	sw.
4B	Sidney	Shelby								49.8	87.0	14	20.0	2	67.0	25.2	42.5	17	8.0	22	8	12	10	12	3.30	.110	sw.
5	Up'r Sandusky	Wyandot	30.033	30.380	3	29.770	23	.610	69.0	48.8	84.0	14	22.0	2	62.0	19.9	39.0	14	6.0	6	11	9	10	8	3.29	.110	sw.
6	Wauseon	Fulton	29.970	30.280	3	29.660	11	.680	72.8	45.2	84.5	14	17.8	2	66.7	24.1	40.7	14	10.6	1	9	12	9	13	1.63	.054	sw.
7	Lebanon	Warren							75.8	51.3	87.5	14	23.6	3	58.9	21.9	35.3	17	6.7	2	9	14	7	13	4.56	.152	sw.
8	N. Lewisburg	Champaign							73.4	49.1	80.0	14	20.0	2	60.0	19.7	33.0	17	9.4	19	13	6	11	11	3.90	.130	n.
9	Levering	Knox							67.9	46.6	83.0	14	20.0	2	63.0	20.2	29.5	14	6.7	5	11	13	6	8	2.23	.074	sw.
10	Toledo	Lucas	29.972	30.262	4	29.578	11	.684	58.3	47.4	80.0	14	20.5	2	59.5	17.4	36.0	14	8.0	1	6	16	8	11	1.57	.052	s.
11	Ironton	Lawrence	29.991	30.363	3	29.564	23	.799		50.3	89.0	14	29.0	26	60.0	24.7	42.0	27	7.0	2				13	4.65	.155	se.
12A	Washington	Fayette							68.5	49.0	86.6	14	24.0	2	62.6	24.9	41.4	17	10.0	5	10	6	14	12	4.03	.134	nw.
12B	Buchanan	Pike																						13	4.00	.135	
13A	Columbus	Franklin	29.984	30.306	3	29.599	23	.707	62.6	50.4	86.0	14	26.0	2	60.0	19.3	32.0	17	10.0	1	10	8	12	12	2.85	.095	ne.
13B	O.S. University	Franklin							74.4	48.7	86.5	14	22.0	3	64.5	24.6	42.8	17	9.0	1	8	13	9	12	2.98	0.99	nw.
13C	Westerville	Franklin	29.998	30.338	3	29.630	23	.708	78.9	48.0	85.0	14	23.0	2	62.0	20.4	33.5	18	10.0	1	9	10	11	9	2.65	.088	s.
14	Oberlin	Lorain	30.045	30.346	3	29.662	23	.684	79.0	43.6	90.0	14	15.0	3	75.0	24.1	51.0	18	9.0	7	5	15	10	9	1.86	.062	n.
15	Marietta	Washington	30.023	30.379	3	29.614	23	.765	76.0	50.9	88.2	14	29.6	24	58.6	23.6	39.4	13	10.3	2	5	13	12	9	4.77	.159	nw.
16	Granville	Licking							75.9	48.9	86.0	14	21.9	2	64.1	20.8	35.0	14	7.0	1	9	11	10	6	2.33	.078	nw.
17	Quaker City	Guernsey							73.0	48.5	84.0	14	24.0	1	60.0	22.3	40.0	17	10.0	2	11	9	10	11	4.56	.152	W.
18	Canton	Stark	30.014	30.341	3	29.618	11	.723	71.8	46.2	85.6	14	21.2	3	64.4	21.5	35.0	15	8.2	22	4	14	12	10	2.06	.069	sw.
19	Warren	Trumbull							64.5	45.7	85.0	14	20.1	2	64.9	20.0	33.8	17	5.5	25	7	12	11	10	2.04	.068	sw.
20	Wooster	Wayne	30.031	30.361	3	26.654	11	.707	76.0	43.3	83.5	14	19.0	2	64.5	18.7	34.0	17	5.0	7	6	16	8	5	1.42	.047	n.
21A	Cleveland	Cuyahoga	29.992	30.271	3	29.601	11	.670	64.7	44.0	85.0	14	19.3	2	65.7	17.3	30.6	14	5.3	7	7	14	9	11	2.10	.070	ne.
21B	Cleveland	Cuyahoga								44.8	85.0	14	20.0	2	65.0	18.6	33.5	23	7.0	24	4	11	15	12	2.01	.067	ne.
	State		30.009	30.382	3	29.516	23	.866	71.5	48.1	90.0	14	15.0	3	75.0	21.5	42.8	17	5.0	7	8.4	11.6	10.0	11.0	3.06	.102	sw.

NOTE.—The means are computed only from station reports covering the entire month, and whose instruments have been compared with standards.

Mr. A. J. McWhirter, Commissioner of Agriculture, Statistics, and Mines for the state of Tennessee, in his report for April, 1883, publishes the following meteorological summary:

SUMMARY OF WEATHER REPORT FOR APRIL, 1883.

Mean temperature, 59°2.
Highest temperature, 92°, on the 14th, at Murfreesborough.
Lowest temperature, 20°, on the 16th, at Cedar Ridge.
Range of temperature, 72°.
Mean daily range of temperature, 24°.
Greatest daily range of temperature, 41°, on the 17th, at Savannah.
Least daily range of temperature, 2°, on the 9th, at Benton and Grassy Cove.
Mean depth of rain or melted snow, 6.89 inches.
Greatest depth of rain or melted snow, 10.7 inches, at Waverly.
Least depth of rain or melted snow, 4.91 inches, at Alexandria.
Average number of clear days, 10.
Average number of fair days, 9.
Average number of cloudy days, 11.
Average number of days on which rain or snow fell, 9.
Prevailing direction of the wind, south.

In submitting his report, Mr. McWhirter says:

* * * * * *

The accompanying report compiled from observations made at thirty-seven different stations throughout the state, embracing all the different altitudes and climates, from the mountains in the east to the lowlands along the Mississippi. It is necessarily incomplete, as many of the observers have not yet been fully equipped with the necessary instruments and apparatus for accurate observations, but it is perhaps as nearly correct as practicable under the circumstances.

* * * * *

The following summary has been forwarded by S. R. Thompson, Director of the "Nebraska Weather Service":

NEBRASKA WEATHER-SERVICE BULLETIN FOR APRIL, 1883.

The weather for the month was a trifle warmer than usual, while the rainfall was normal.

Rainfall.—The rainfall by sections was as follows: southeast, 1.57 inches; northeast, 1.86 inches; southwest, 3.97 inches; northwest, 2.39 inches. Average for the entire state, 2.44 inches.

Temperature.—The mean temperature of the air was 52.8. The average of all noon observations was 59.7. The following were some of the maximum and minimum temperatures:

Omaha, max., 88.2; min., 32.0. North Platte, max., 79.3; min., 21.0. De Soto, max., 95.0; min., 30.0. Agricultural college, max., 91.0; min., 26.0.

Relative humidity.—Omaha, max., 77.0; min., 35; mean, 57.0. North Platte, mean, 64.9. De Soto, mean 63.4. Agricultural College, 61.3.

Wind.—Miles traveled: Omaha, 8,015; North Platte, 9,256.

Prevailing direction: Omaha, southeast; North Platte, Northeast; Agricultural College, east.

Greatest velocity; Omaha, 35 miles, northwest; North Platte, 52 miles, southeast; Agricultural College, 50 miles.

Miscellaneous.—Snow covered the ground at Minden on the 24th. Killdees seen on 2d at Red Willow. Martins and Killdees on 3d at Genoa. Lunar halos on 11th and 19th at Agricultural College, and solar halos on 15th and 19th.

Miss Kate McKenzie, of Peru, reports that hailstones one inch in diameter fell on the 13th. "The voice of the turtle was heard in the land" first, on the 3d, at Crete.

Most observers report a very backward season. Nearly all observers report early apples, cherries, and plums in bloom, toward the latter part of the month.

Correction.—In the March bulletin, noon temperature 42°, at Central City, was reported as daily mean temperature, which was 31.5°.

The State Weather Service of Michigan, is under the direction of Dr. H. B. Baker, Secretary of the Michigan State Board of Health. The observers of this service, twenty in number, forward their reports direct to the Office of the Chief Signal Officer, for use in the preparation of the MONTHLY WEATHER REVIEW. They also furnish reports to Dr. Baker, who is carefully studying the influence of climatic conditions in their relation to the health statistics of Michigan. An extract from Dr. Baker's annual report, published under "Notes and Extracts" in the REVIEW, for December, 1882, will clearly show the importance of this work.

Professor J. T. Lovewell, of Washburn College, Topeka, Kansas, is now engaged in organizing a weather service for that state.

ERRATA.

On page 56 of the March REVIEW, under the heading "North Atlantic Storms, &c," the following corrections should be made:

Low-area ii., tenth line, ranging from 2.69, should read 29.6.

Low-area iv., fifth line, vessels to the westward of the sixteenth meridian, &c., should read, vessels to the westward of the sixtieth meridian.

Chart I. Tracks of Low-Barometer Areas, April, 1883.

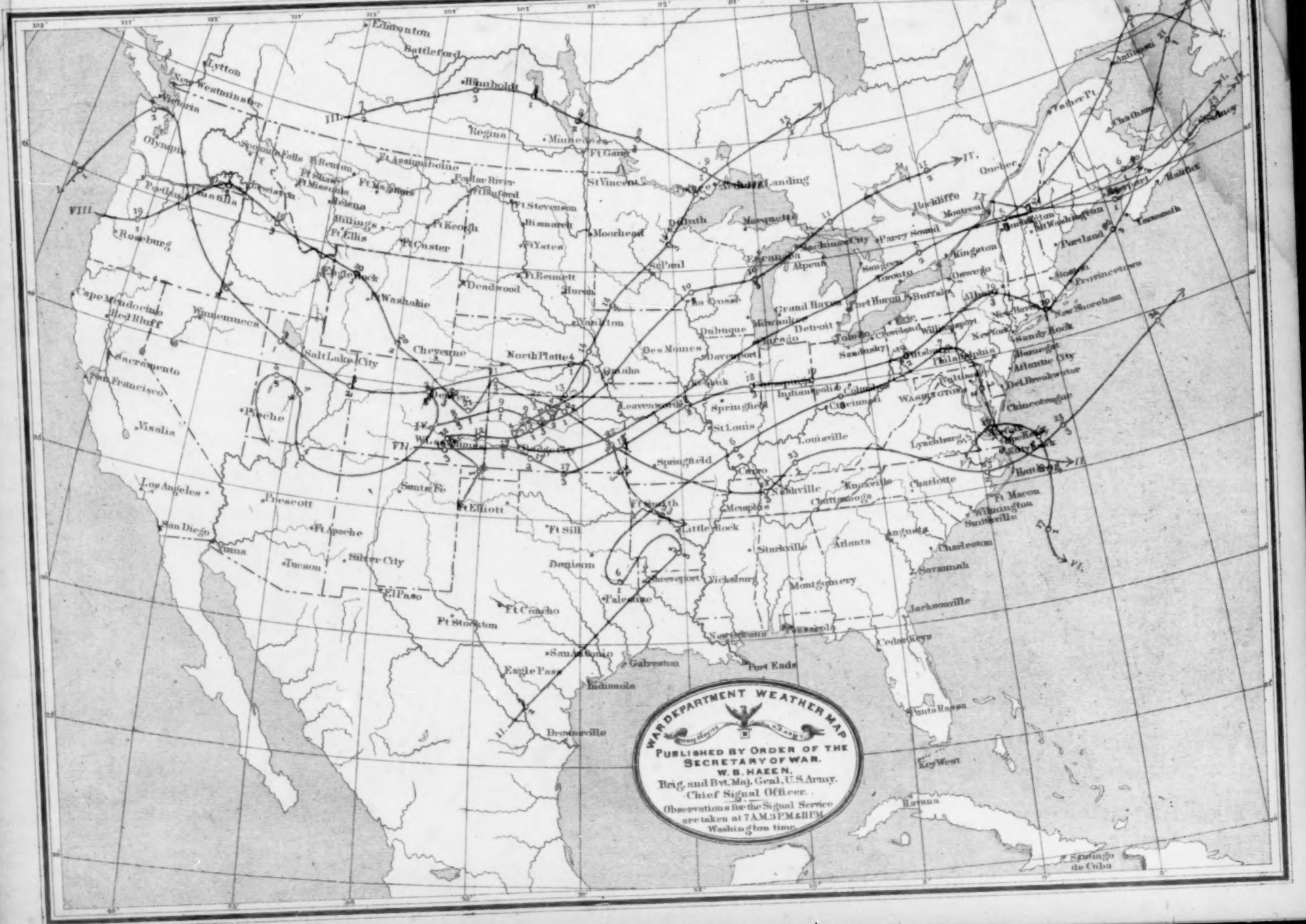


Chart II. Ocean Storm Tracks, April, 1883.

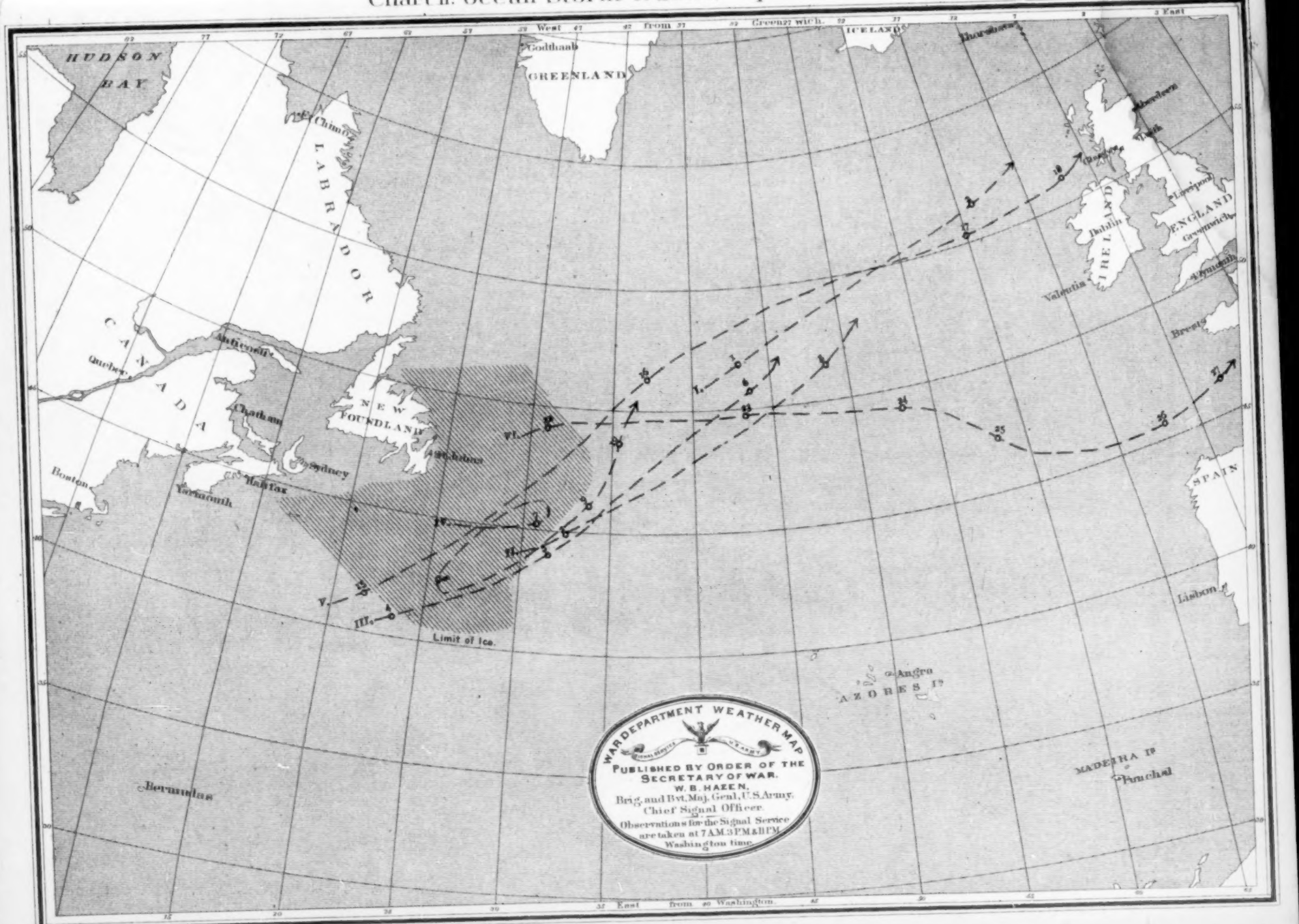


Chart III. Isobars, Isotherms, and Winds. April, 1883.

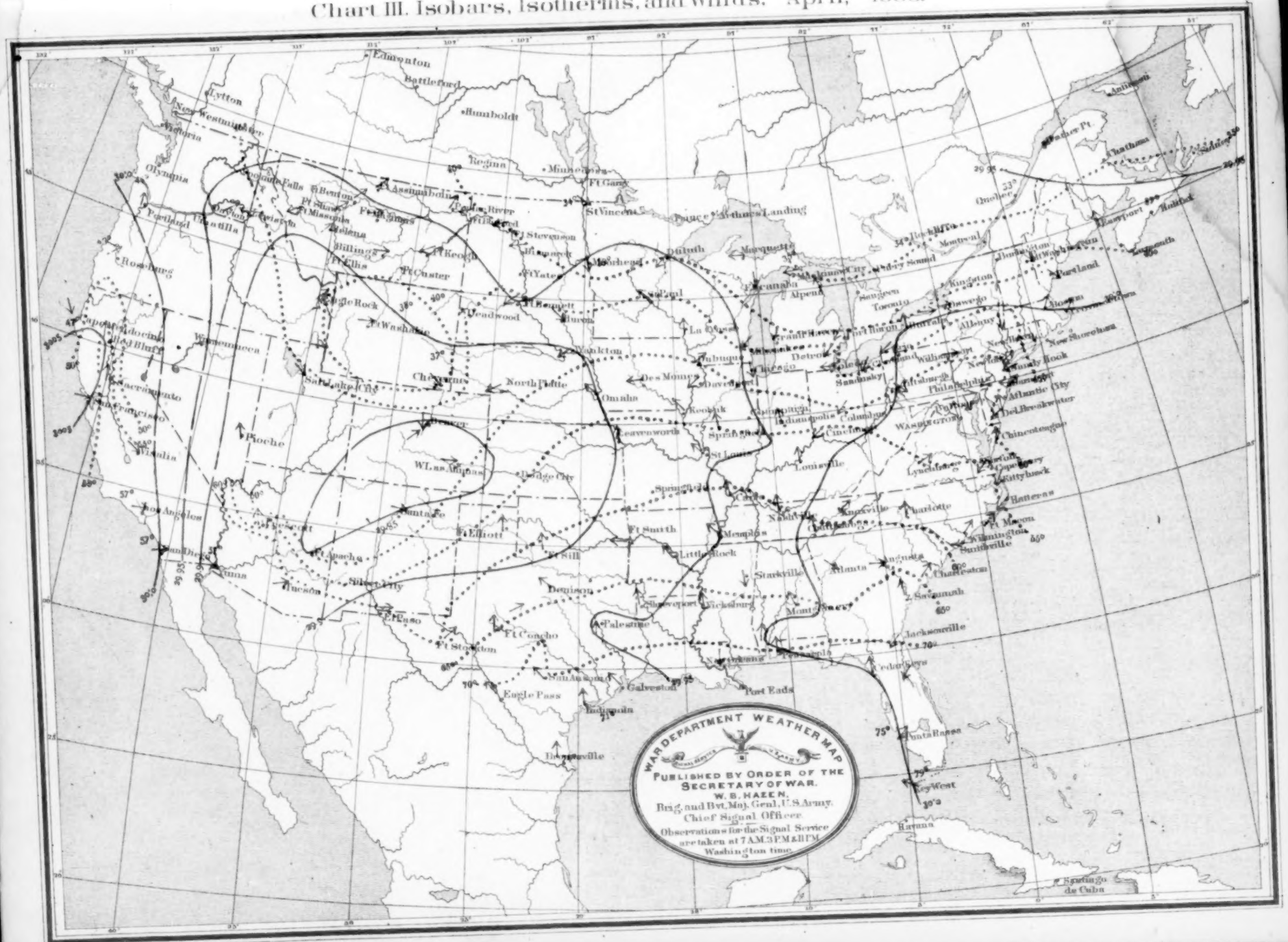
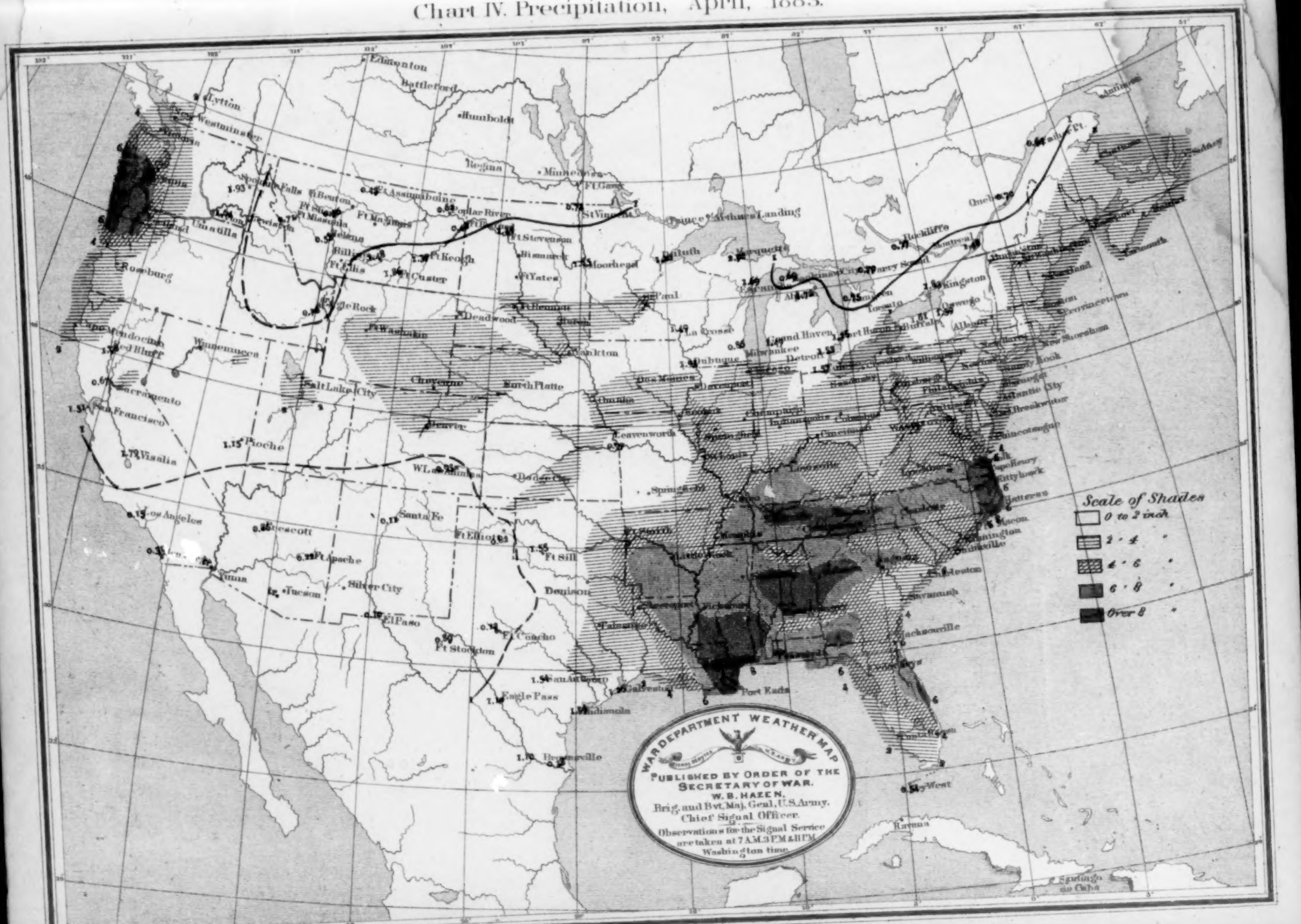

WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. S. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army.
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. Washington time.

Chart IV. Precipitation, April, 1883.


Scale of Shades
0 to 2 inch
2 · 4 "
4 · 6 "
6 · 8 "
Over 8 "
WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl, U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. Washington time.